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FISH POPULATIONS OF CARNATION CREEK AND OTHER BARKLEY SOUND STREAMS 1981-1982

by

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ABSTRACT

Andersen, B. C. 1983. Fish populations of Carnation Creek and other Barkley Sound streams 1981-1982. Can. Data Rep. Fish. Aquat. Sci. 435: iii + 63 p.

A summary of fish population data, collected as part of the Carnation Creek Experimental Watershed Project, is presented. The time period covered is January 1981 to December 1982.

Key words: Watershed study, coho, chum, steelhead, cutthroat, sculpin, logging, Carnation Creek

RÉSUMÉ

Andersen, B. C. 1983. Fish populations of Carnation Creek and other Barkley Sound streams 1981-1982. Can. Data Rep. Fish. Aquat. Sci. 435: iii + 63 p.

On présente un résumé des données sur les populations de poisson, recueillies dans le cadre d'un project d'étude expérimentale du bassin hydrographique du ruisseau Carnation, de janvier 1981 à décembre 1982.

Mots-clés: étude du bassin hydrographique, saumon coho, saumon kéta, truite arc-en-ciel anadrome, truite fardée, chabot, abattage du bois, ruisseau Carnation

INTRODUCTION

The Carnation Creek Experimental Watershed Project started in 1970 with the initiation of pre-logging studies (Narver and Chamberlain 1967). Road construction started in January 1975 and logging started in the fall of 1975. Most of the road construction was completed by the end of the 1977-78 winter. Logging was completed in June 1981 (Fig. 2).

The basic rational for the study, tne study sites, adjacent study streams (Fig. 1), and methods used in fish studies have all been described in Andersen (1983). All comparisons in this report have reference to Andersen (1983). This report covers the period January 1981 to December 1982.

RESULTS

ADULT STUDIES

Coho

In 1981 and 1982 the return of jack coho was at pre 1978 levels, large males were within the range of previous years and in 1981 females had the lowest return recorded in this study (44% fewer than the 12 yr mean).

Year	Return		
	Jack (.+)	Large male (.1+)	Female
12 yr. mean (1971-1982)	84.6	89.3	76.9
1981	61	76	43
1982	61	103	71

The age compositions of adult coho are given in Table 1.

In both 1981 and 1982 the mean fork lengths of jack coho (.+) and females are within the range of previous years and near the 12 year average of yearly means. The large males (.1+) had fork lengths at the lower end of the range and 1982 large males had the lowest mean fork length of all years studied. The 12 year average of yearly means was 33.7 cm for jacks, 59.0 cm for large males and 65.2 cm for females. Length distributions and mean length by age and sex are given in Table 3.

Time of entry into the stream continues to be strongly dependent on stream discharge levels (Table 2). In both years (1981 and 1982) 85% of the adult coho run had passed the counting fence by mid November.

Chum

The estimates of chum salmon spawning escapement (above and below fence in Carnation Creek were:

Year	Escapement
13 year mean (1970-1982)	2014 (range 450-4168)
1981	2300
1982	1600

Weekly counts of chum salmon, by sex, passing Carnation Creek fence in 1981 and 1982 are in Table 4.

Length distributions, by sex are given in Table 5. The mean fork lengths were:

Year	Male (cm)	Female (cm)
13 yr average of yearly means	73.0	70.5
1981	74.7	72.2
1982	71.9	69.2

The dominant age group of chum adults continued to be three winters in the ocean as determined by otoliths (Table 6).

Steelhead and cutthroat

No steelhead were caught in 1981 or 1982. One cutthroat was caught April 12, 1981 going downstream (length 61 cm, age 3.3).

The fact that no steelhead and only one cutthroat were caught is not an indication of returns. When the fence is fishing for juveniles from mid March to August high stream discharge can flood out the fence and allow adult fish to pass unobserved. Also the fence was not operated from Jan. 24 - Feb. 22, 1982.

Other salmon

In both 1981 and 1982 a few sockeye spawners were observed below the counting fence. In 1982, for the first time, a few chinook adults were observed in intertidal area below the fence. No pink spawners were seen in 1981 or 1982.

JUVENILE STUDIES

The basic data on length, length-weight, condition factor, populations, densities, and biomass for juvenile fish are in the appendixes.

Downstream migrants

Outmigrations of juvenile salmonids in relation to date, water temperature, and maximum stream discharge are presented in Figs. 3 and 4. Total counts for 1981 and 1982 are summarized in Table 7.

Coho

A summary of juvenile coho outmigration data by age:

Year	Fry run	I+ <60 mm run	I+ ≥ 60 mm run	I+ ≥ 60 mm Mean length (mm)	II+ Run	II+ Mean length (mm)	Total I+,II+, run ≥60 mm
12 yr mean 1971-82	17,520[a]	82	2129	79.6[b]	878	99.8[b]	3007
1981	11,303	49	3719	82.4	396	104.1	4115
1982	4,108	1	2847	86.6	622	100.1	3469

[a] 11 year mean (1972-82)

[b] average of the yearly means

The numbers of age I+ coho smolts in both 1981 and 1982 continue a trend that started in 1978 of being much above the mean. Age II+ smolts numbers have declined dramatically in the past 2 years, with 1981 numbers being 55% below the 12 year mean and 1982 numbers being 29% below the mean.

In 1981 and 1982 the coho smolts migrated primarily in late April and early May. The 50% point of the run (Table 8) occurred very close to the 12 year mean date of May 6.

The weekly mean lengths of coho smolts (Fig. 5) were similar to those observed in previous years for age II+, but age I+ continued a trend to larger smolts that started in 1978. The 1982 age I+ smolts were the largest for all years studied.

In 1981 and 1982 coho fry numbers were much less than the 12 year mean. The 1982 run was smallest of all years studied and is probably a reflection of a very low number of female coho spawners the previous fall. In 1981 the 50% point of the coho fry run (Table 8) was 17 days earlier than the previous earliest date and 35 days earlier than the 12 year mean date. This trend to earlier fry migration started in 1977. Mean lengths of coho fry in the downstream run are summarized in Table 9.

Chum salmon

Chum fry outmigrations from above the fence:

11 yr mean 1972-1982	45532
1981	71640
1982	2904

In 1981 the 50% point of the chum fry run (Table 8) occurred 30 days earlier than the 12 year mean date. Mean lengths of chum fry in the downstream run are summarized in Table 9.

Steelhead and cutthroat

	Steelhead				Cutthroat		
	<100 mm	≥100 mm			<100 mm	≥100 mm	
Year	Run	Run	Mean length	50% point of run	Run	Run	Mean length
11 year mean	90.2	67.4	141.2[a]	May 16	12.0	44.9	136.0[a]
1981	21	14	136.7	Apr 23	19	38	123.5
1982	17	36	134.6	May 10	8	6	152.3

[a]Average of yearly mean lengths.

The 50% point of steelhead smolt outmigration shows a trend, starting in 1977, of being much earlier than in previous years. In 1981 the 50% point is 3 weeks earlier than the 11 year mean date. The numbers of both steelhead and cutthroat smolts continue to show the large decline that started in 1978. Mean lengths of both cutthroat and steelhead (≤100 mm) are within the range of previous years.

The age compositions and mean lengths of juvenile steelnead and cutthroat in the downstream migrations are given in Table 10.

Resident fish

The late summer population estimates and fish densities for the lowest 3070 m of Carnation Creek are given in Tables 11 and 12.

Late summer population estimates for lower Carnation Creek:

	Coho		Rainbow			Cottus aleuticus
	0	I	0	I	II	All
13 year mean (1970-82)	11,499	1,128	1,908	292	104	(2519)[a]
1981	5,909	743	1,774	116	8	2187
1982	7,337	220	1,063	346	47	1811

[a]1972-1982.

The population estimates for age 0 coho are much lower than the 13 year mean for both 1981 and 1982 and well below the range of previous years. The 1981 estimate of age I coho is within the range of previous years but the estimate for 1982 is less than a third of the previous low and 19.5% of the 13 year mean. The numbers of rainbow trout recovered somewhat from the decline of the previous 4 years. The sculpin populations in 1981 and 1982 were within the range of previous years.

The late summer fish densities by study section for lower Carnation Creek (Table 12) show that densities of age 0 coho were lowest of all years studied for both 1981 and 1982 in section II, near the mean for sections III and IV and among lowest for sections V, VI and VIII. For age I coho in sections II to VI densities were among the lowest for 1981 and by far the lowest in 1982; section VIII densities were near the 13 year mean.

Densities of sculpins were within the range of previous years in all study sections.

In late July of 1982 the usual population estimates were done. In addition six extra study sections were done in order to check the validity of extrapolating the fish populations of approximately 13% of lower Carnation Creek to all 3070 meters of lower Carnation Creek. The addition of the extra sections resulted in 25% of lower Carnation Creek being sampled. Using data from the usual 6 study sections the extrapolated population estimates were 1.9% higher for age 0 coho and 21% higher for age I coho than when data from all 12 sections were used.

Late summer density of resident fish in 1981 and 1982 for Carnation Creek and other streams are summarized in Table 13. In both years the densities of age 0 and I cutthroat in Upper Carnation Creek were higher than any previous year. Densities of coho fry in Useless Creek were very low in both years and in 1981, lowest of all years studied. Useless Creek cutthroat fry densities were lowest in 1981 and highest in 1982 of all years studied. Cutthroat fry densities in Ritherdon Creek have recovered to pre-1976 levels.

Late summer biomasses (g/m) of resident fish in 1981 and 1982 are summarized for all streams in Table 14.

A summary of late summer mean lengths (mm) for all streams and all salmonid species is given in Table 15. In both 1981 and 1982, lower Carnation Creek age 0 and I coho were larger than in any previous year.

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Table 1. Age composition of adult coho salmon run in Carnation Creek 1981-1982.

		Total age						Fresh water			Ocean		
		1.+	2.+	Total	1.1+	2.1+	Total	1.	2.	Total	.+	.1+	Total
1981													
♂	n	34	22	56	58	12	70	92	34	126	61	76	137
	%	60.7	39.3		82.9	17.1		73.0	27.0		44.5	55.5	
♀	n	0	0	0	31	6	37	31	6	37	0	43	43
	%				83.8	16.2		83.8	16.2		0	100.0	
Total	n	34	22	56	89	18	107	123	40	163	61	119	180
	%	60.7	39.3		83.2	16.8		75.5	24.5		33.9	66.1	
1982													
♂	n	34	21	55	83	15	98	117	36	153	61	103	164
	%	61.8	38.2		84.7	15.3		76.5	23.5		37.2	62.8	
♀	n	0	0	0	60	10	70	60	10	70	0	71	71
	%				85.7	14.3		85.7	14.3		0	100.0	
Total	n	34	21	55	143	25	168	177	46	223	61	174	235
	%	61.8	39.3		85.1	14.9		79.4	20.6		26.0	74.0	

Note: Difference between total fresh water and ocean numbers due to scales being unreadable in the fresh water zone.

Table 2. Weekly fence count of coho salmon into Carnation Creek by ocean age and sex in 1981-1982.

1981						1982					
				Total						Total	
Week	♀ n	♂(.1+) n	Jack n	n	Accum %	Week	♀ n	♂ (.1+) n	Jack n	n	Accum %
Sept 2			1	1	.6	Sept 10			1	1	.4
21		2	3	5	3.3						
27-Oct 3	4	8	19	31	20.6						
Oct						Oct					
4-10	9	6	18	33	38.9	3-9	14	29	17	60	26.0
11-17	0	0	5	5	41.7	10-16	0	0	6	6	28.5
18-24	0	0	0	0		17-23	14	22	7	43	46.8
25-31	7	13	1	21	53.3	24-30	21	30	14	65	74.5
Nov						Nov					
1-7	5	6	5	16	62.2	Oct 31-6	7	5	1	13	80.0
8-14	6	22	6	34	81.1	7-13	1	2	0	3	81.3
15-21	4	6	1	11	87.2	14-20	2	1	2	5	83.4
22-28	0	0	0	0		21-27	0	0	0	0	
29-Dec 5	4	12	0	16	96.1	28-Dec 4	11	13	11	35	98.3
Dec						Dec					
6-12	2	0	0	2	97.2	5-11	0	0	1	1	98.7
13-9	2	1	2	5	100.0	12-18	1	1	1	3	100.0
Total	43[a]	76	61	180			71	103	61	235	
Sex ratio large ♂ : ♀	1.77:1					large ♂ : ♀	1.45:1				

[a]In 1981 5♀, 5♂ and 2 Jack coho were used for an egg take thus reducing to 38 the number of female coho available for depositing eggs upstream of the fence.

Table 3. Length frequency and mean length of adult coho salmon in Carnation Creek by ocean age and sex 1981, 1982.

Fork length (cm)	Jacks (.+)		Large males (.1+)		Females (.1+)	
	1981	1982	1981	1982	1981	1982
22						
23						
34						
25	1	2				
26	2	1				
27	2	1				
28	1					
29	4	2				
30	6	1				
31	9	4				
32	8	4				
33	4	4				
34	6	7				
35	5	9				
36	8	5		1		
37		3	1			
38		4		1		
39	1	4				
40	1	3	4	2		
41		2		1		
42	2	1		1		
43		1		3	1	
44				3		
45	1		3	1		
46			3	3		
47			2	2		
48			2	1		
49			1	2		
50			4	5	1	2
n	61	58				
$\bar{x}$ (cm)	32.74	34.74				
S	3.89	4.06				

Table 3 (cont'd)

Fork length (cm)	Large males (.1+)		Females (.1+)	
	1981	1982	1981	1982
51	7	5		
52	4	6	1	1
53	4	2		2
54	2	6		2
55	2	5		1
56		7	1	2
57	2	2	1	2
58	1	4	3	2
59	3	5	5	4
60	5	6	1	3
61	1	2	1	3
62	2	3		3
63	2	5	1	1
64	2	1	2	1
65	1	6	2	5
66		4	3	5
67	2	1	1	7
68	4	1	3	5
69	3	1	3	5
70	1	1	3	
71		1		1
72				6
73	1		2	3
74		1		2
75			1	1
76	1	1		1
77				
78	1		2	
79	1		1	
80				
n	72	102	39	70
$\bar{x}$ (cm)	56.19	55.61	64.39	64.36
S	9.61	8.24	7.78	6.56

Table 4. Weekly count of adult chum salmon, by sex, passing Carnation Creek fence in 1981, 1982.

Week	♀ n	♂ n	Total n	Total Accum %
		1981		
Oct				
4 - 10	1	4	5	16.5
11 - 17	0	0		
18 - 24	0	1	1	20.0
25 - 31	5	17	22	93.3
Nov				
1		1	1	96.7
Dec				
2		1	1	100.0
Total	6	24	30	

Week	♀ n	♂ n	Total n	Total Accum %
		1982		
Oct				
3 - 9		1	1	7.1
10 - 16				
17 - 23	6	6	12	92.9
24 - 30		1	1	100.0
Total	6	8	14	

Table 5. Length frequency (fork length) of adult chum salmon by sex in Carnation Creek 1981, 1982.

Fork length (cm)	Males		Females	
	1981	1982	1981	1982
60	1			1
61		2		
62	1	1		3
63		1		1
64	1	2	2	5
65	1	2	3	4
66	1	2	1	7
67	2	7	2	12
68	3	8	4	11
69	4	7	9	11
70	5	7	9	7
71	7	5	14	12
72	7	9	14	9
73	8	6	9	3
74	7	9	12	5
75	8	13	7	4
76	5	3	6	1
77	10	7	4	2
78	7	3	4	
79	3	1	2	1
80	6	3	2	
81	2	1		
82	8			
83				
84	3	1		
n	100	100	104	98
$\bar{x}$	74.67	71.90	72.23	69.19
S	4.98	4.58	3.47	3.64

Table 6. Fork length and age composition (otoliths) of chum salmon in Carnation Creek 1981 and 1982.

Fork length (cm)	Males						Females					
	0.2		0.3		0.4		0.2		0.3		0.4	
	1981	1982	1981	1982	1981	1982	1981	1982	1981	1982	1981	1982
60	1							1				
61		1										
62	1	1						2		1		
63		1		1						1		
64				1			2	3		2		
65		2	1				2	1	1	3		
66	1	1		1					1	7		
67	1	1	1	6				2	2	10		
68	1		1	6			1	3	2	8		
69	2	2	1	5			2		8	11		
70	1	1		5					6	6		
71	2		3	5			3		12	13		
72	1		5	9				1	14	8		
73			4	6					7	2		1
74			4	9					12	4		1
75			8	12		1			5	4	1	
76			4	3					5	1		
77			8	7					4	1		1
78			5	2		1			4		1	
79			2							1	1	
80			7	3		1			1		1	
81			1	1	1							
82			6		2							
83												
84			1		1	1						
n	11	10	62	82	4	4	10	13	84	83	4	3
$\bar{X}$ (cm)	67.7	65.7	76.0	72.5	80.2	79.2	67.7	65.5	72.5	69.6	78.0	74.7
%	14.3	10.4	80.5	85.4	5.2	4.2	10.2	13.1	85.7	83.8	4.1	3.0

Table 7. Summary of downstream counts of juvenile salmonids and cottids at the Carnation Creek counting fence 1981, 1982.

Species	Age	1981	1982
Chum	Fry	71640	2904
Coho	Fry	11303	4108
	I+ (<60 mm)	49	1
	I+ (≥60 mm)	3719	2847
	II+	396	622
	Total I+(≥60 mm), II+	4115	3469
Steelhead	<100 mm	21	17
	≥100 mm	14	36
Cutthroat	<100 mm	19	8
	≥100 mm	38	6
Cottus asper		213[a]	527[b]
Cottus aleuticus		34[a]	60[b]
Sampling period		Mar 5-Aug 4	Mar 5-Aug 15

Note: in 1981 895 pink fry were caught at the fence.

[a]Counts ends July 7

[b]Counts ends July 8

Table 8. Dates when 25, 50 and 75% of the downstream migration of coho, chum, and steelhead occurred in Carnation Creek 1981, 1982.

Species	Accum %	1981	1982
Coho smolts	25	April 24	April 29
	50	May 5	May 6
	75	May 17	May 14
Steelhead (≥100 mm)	25	March 31	April 28
	50	April 23	May 10
	75	May 17	May 18
Coho fry	25	March 22	March 31
	50	March 24	April 11
	75	March 28	April 13
Chum fry	25	March 15	April 15
	50	March 21	April 16
	75	March 23	April 18

Table 9. Mean length, range and standard deviation of coho and chum fry at ~1 week intervals in the 1981, 1982. Carnation Creek outmigrations.

Date		Coho fry				Chum fry			
		$\bar{x}$ (mm)	n	S	Range (mm)	$\bar{x}$ (mm)	n	S	Range (mm)
1981									
March	5	36.06	109	1.765	31-40	41.35	60	1.376	39-44
	12	36.79	57	1.521	32-40	40.87	70	1.250	39-43
	19					41.60	50	1.069	39-44
	20	37.70	60	0.908	36-40				
	26	37.02	51	2.025	32-40	41.40	50	1.457	39-45
April	2	37.42	50	1.416	34-41	42.35	49	1.251	39-44
	9	37.68	47	1.889	31-41	42.66	38	1.169	40-45
	15	37.72	25	1.969	33-41	42.00	32	1.078	40-45
	29	40.03	37	2.598	35-48				
May	25	48.30	23	4.967	38-58				
June	6	49.53	45	5.255	38-59				
	28	57.84	38	3.866	51-65				
1982									
March	15	37.00	18	2.058	34-40				
	25	37.68	59	1.995	35-41				
April	11	36.64	72	0.997	35-39	43.73	63	0.677	42-45
	15					43.16	50	0.618	42-44
	20					43.73	52	0.770	42-45
	30					42.31	26	0.736	41-44

Table 10. Age composition and mean lengths of rainbow and cutthroat trout in the downstream migrations in Carnation Creek 1981, 1982.

		Rainbow				Cutthroat			
Year	Age	n	$\bar{x}$ (mm)	S	Range (mm)	n	$\bar{x}$ (mm)	S	Range (mm)
1981	I	21	87.4	9.60	65-99	19	92.3	10.52	70-117
	II (all)	8	110.5	5.45	102-117	32	113.2	12.00	90-137
	II (≥100 mm)	8	110.5	5.45	102-117	29	115.3	10.43	101-137
	III	6	171.7	30.83	145-215	6	171.0	25.78	146-218
	IV	-				-			
Total	(≥100 mm)	14	136.7	36.99	102-215	38	123.5	24.80	101-218
1982	I	21	91.8	10.81	80-125	5	82.4	9.32	69-95
	II (all)	21	127.3	17.42	95-148	5	106.0	21.67	88-135
	II (≥100 mm)	20	128.9	16.17	102-148	2	129.0	8.48	123-135
	III	11	157.6	10.38	145-185	4	164.0	18.78	142-182
	IV								
Total	(≥100 mm)	36	134.6	21.93	100-185	6	152.3	23.51	123-182

Table 11. Late summer resident population estimates on lower Carnation Creek (3070 m) 1981, 1982.

	1981				1982			
			95% CI				95% CI	
Species	Age	n	Lower	Upper	Age	n	Lower	Upper
Coho	0	5909	5819	5999	0	7337	7274	7396
	I	743	701	781	I	220	184	250
	Total	6652			Total	7557		
Rainbow	0	1774	1723	1821	0	1063	1002	1119
	I	116	111	122	I	346	269	427
	II	8	8	8	II	47	37	61
	III	8	8	8	Total	1456		
	Total	1906						
Cutthroat	0	8	8	8	0	47	47	47
	I	149	99	198	I	63	56	73
	II	~50			II	79	50	104
	III	~15			III	16	16	16
	Total				Total	205		
Cottus aleuticus	All	2187	819	3554		1811	1658	1969

Table 12. Late summer fish density (fish/m^2) by study section and species in lowest 3070 m of Carnation Creek 1981, 1982.

Species	Age	II	III	IV	V	VI	VIII	Combined[a]
1981								
Coho	0	.14	.43	.80	.38	.26	.30	.38
	I	.02	.03	.09	.06	.03	.08	.05
Rainbow	0							.11
	I							.01
	II							.0005
	III							.0005
Cutthroat	0							.0005
	I							.009
	II							.003
	III							.001
C. asper	Σ	.09						
C. aleuticus	Σ	.55	.04	.02	.06	.02	.03	.14
1982								
Coho	0	.36	.56	.72	.35	.57	.53	.51
	I	.01	.03	.01	.01		.04	.02
Rainbow	0							.07
	I							.02
	II							.003
Cutthroat	0							.003
	I							.004
	II							.005
	III							.001
C. asper		.06						
C. aleuticus		.41	.08	.02	.21	.05	.10	.13

[a]Not a mean but derived from areas and catches in all sections combined for population estimate.

Table 13. Late summer fish density (fish/m^2) by species for all streams 1981, 1982.

Species	Age	Lower Carnation	Upper Carnation	Trib "C"	Useless	Ritherdon	South Pachena
1981							
Coho	0	.38			.01		.73
	I	.05					.03
Rainbow	0	.11					.05
	I	.01					.01
	II	.0005					.003
	III	.0005					
Cutthroat	0	.0005	.34	.63	.01	.39	
	I	.009	.24	.15	.05	.07	
	II	.003	.01	.05	.04	.02	
	III	.001			.01	.01	
C. asper							.16
C. aleuticus		.14			.39		.14
1982							
Coho	0	.51			.06		1.11
	I	.02					.03
Rainbow	0	.07					.22
	I	.02					
	II	.003					.01
	III						
Cutthroat	0	.003	.47	.43	.24	.48	
	I	.004	.21	.21	.04	.07	
	II	.005	.004	.01	.02	.04	
	III	.001		.01	.01		
C. asper							.16
C. aleuticus		.13			.59		.10

Table 14. Late summer biomass per unit area (g/m^2) by species for all streams studied in 1981, 1982.

Species	Age	Lower Carnation	Upper Carnation	Trib "C"	Useless	Ritherdon	South Pachena
1981							
Coho	0	1.25			.01		2.00
	I	.30					.23
Rainbow	0	.33					.12
	I	.08					.03
	II	.02					.07
	III	.05					
Cutthroat	0	.001	.79	1.48	.01	.57	
	I	.09	2.29	1.41	.32	1.08	
	II	.09	.23	1.21	.50	.84	
	III	.11			.28	.99	
C. asper		.20					1.27
C. aleuticus		.70			1.41		.52
1982							
Coho	0	1.64			.19		1.82
	I	.13					.31
Rainbow	0	.20					.25
	I	.34					
	II	.11					.36
	III						
Cutthroat	0	.003	.35	.58	.27	.56	
	I	.05	1.84	1.91	.28	.65	
	II	.23	.10	.24	.85	1.56	
	III	.10		1.11	.56		
C. asper		.11					1.63
C. aleuticus		.58			2.64		.32

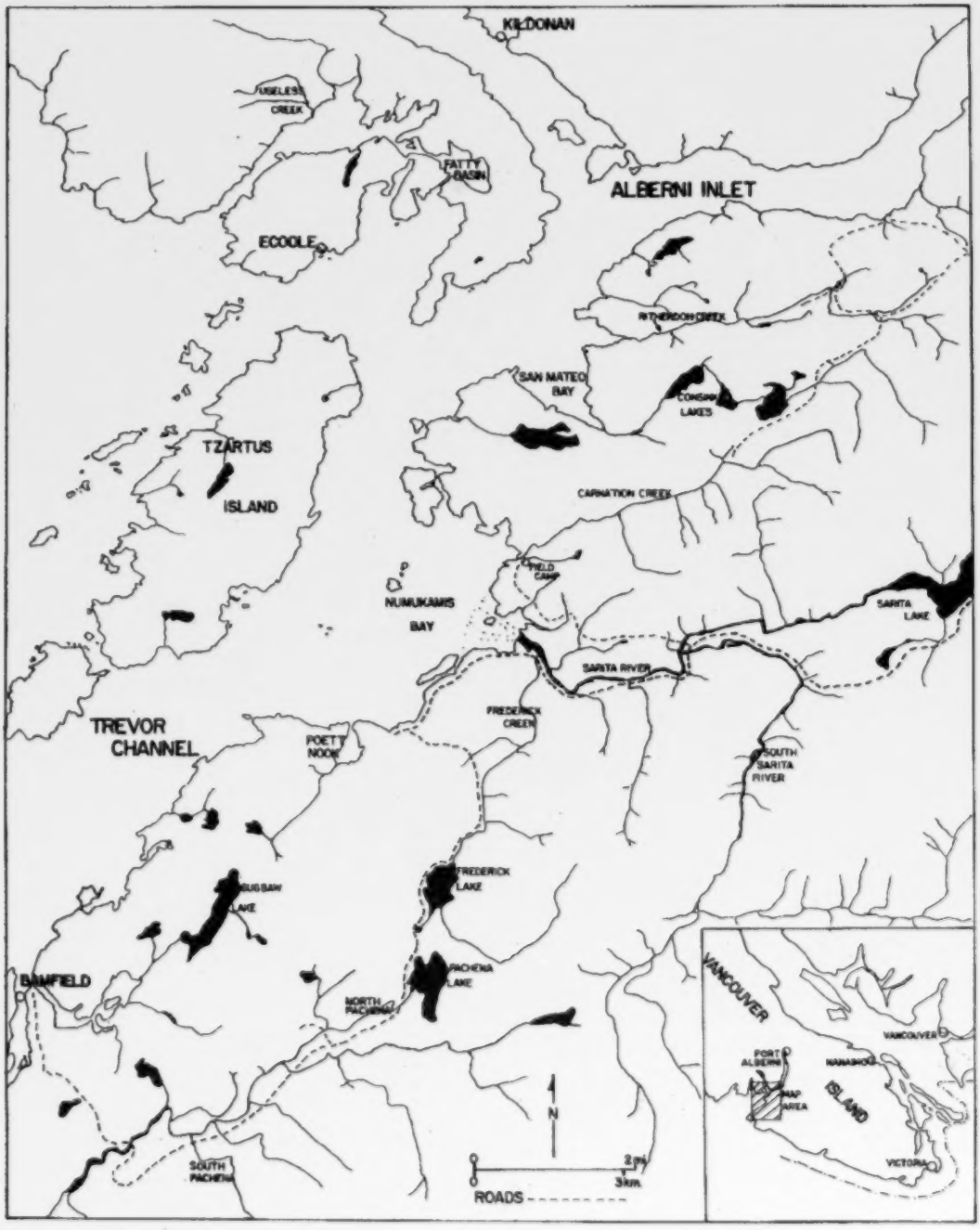
Table 15. Late summer mean lengths (mm) for salmonids in all streams studied in 1981, 1982.

Species	Age	Lower Carnation	Upper Carnation	Trib "1600"	Trib "C"	Useless	Ritherdon	South Pachena
1981								
Coho	0	66.1		62.8		42.0(1)		62.7
	I	82.4		82.0				86.6
Rainbow	0	65.5						60.9
	I	100.6						74.0(2)
	II	142.0(1)						128.0(1)
	III	210.0(1)						
Cutthroat	0	63.0(1)	48.1		59.5	56.0(1)	52.0	
	I	96.7	94.1		98.7	83.4	113.3	
	II	139.6(5)	143.0		137.0(3)	111.8	151.2	
	III	230.0(2)				167.0(1)	198.0(3)	
1982								
Coho	0	65.6		63.6		64.9		53.1
	I	91.4		86.5				100.3
Rainbow	0	64.5						49.7
	I	110.6						
	II	148.5						157.3(3)
	III							
Cutthroat	0	44.3(6)	42.9		51.6	47.5	48.5	
	I	106.9	93.7		96.5	92.4(5)	98.8	
	II	165.0	144.0(1)		123.0(1)	156.3(3)	158.0	
	III	217.5(2)			200.0(1)	194.0(1)		

Note: If the number of fish in a sample is small that number is in brackets after the mean length.

FIGURES

Fig. 1. Map showing location of study streams in the Barkley Sound area. Only main roads shown.


KILDONAN
USELESS CREEK
FATTY BASIN
ALBERNI INLET
ECOOLE
RITHERDON CREEK
SAN MATEO BAY
CONGRA LAKES
TZARTUS ISLAND
CARNATION CREEK
FIELD CAMP
NUMUKAMIS BAY
SARITA LAKE
SARITA RIVER
FREDERICK CREEK
TREVOR CHANNEL
POETT NOOK
SOUTH SARITA RIVER
FREDERICK LAKE
RUGGED LAKE
BAMFIELD
PACHENA LAKE
NORTH PACHENA
SOUTH PACHENA
N
2mi
3km
ROADS
VANCOUVER
VANCOUVER
PORT ALBERNI
NANAIMO
MAP AREA
ISLAND
VICTORIA

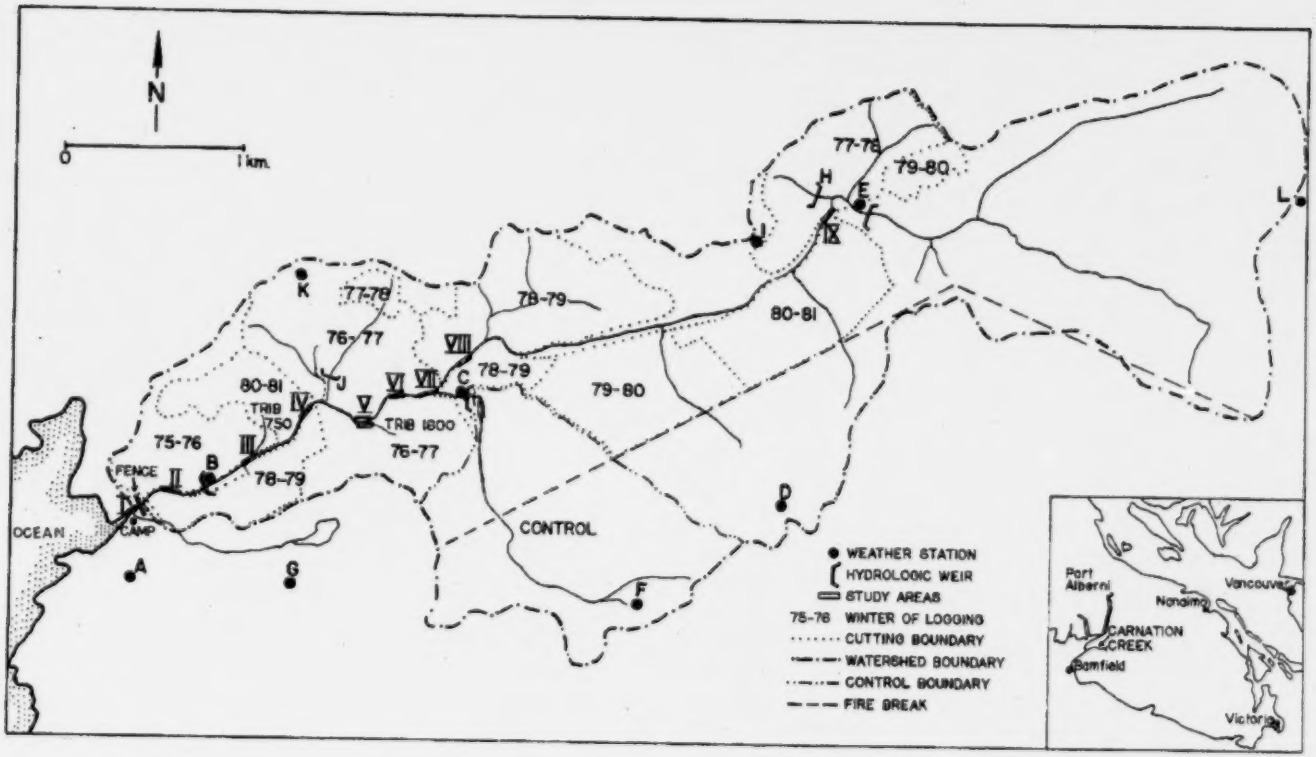


Fig. 2. Carnation Creek Watershed showing the main channel and tributaries; location of hydro-meteorological stations, fish counting fence, stream study sections and clearcuts.

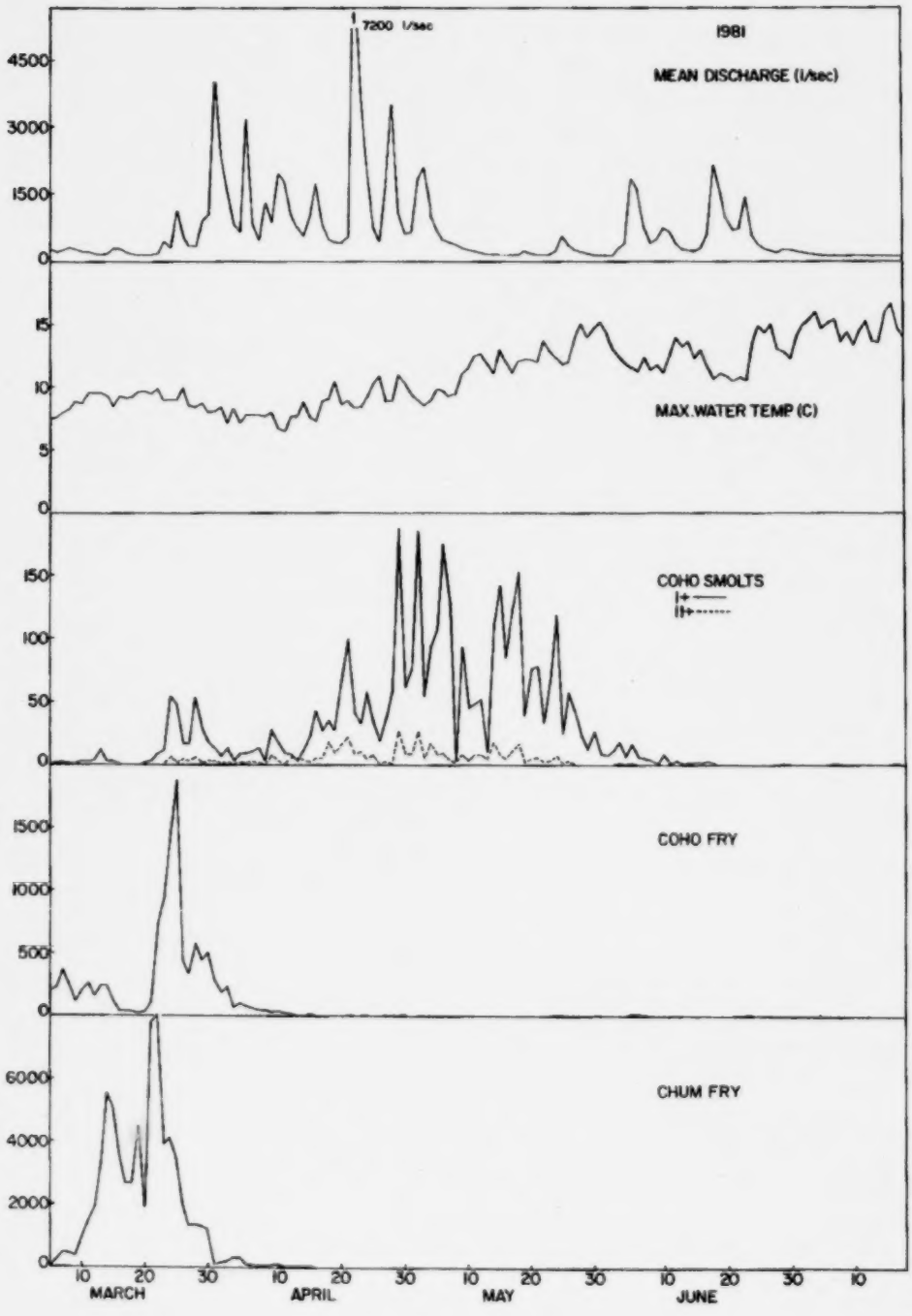


Fig. 3. Outmigration of juvenile salmonids in Carnation Creek in relation to date, water temperature and discharge, 1981.

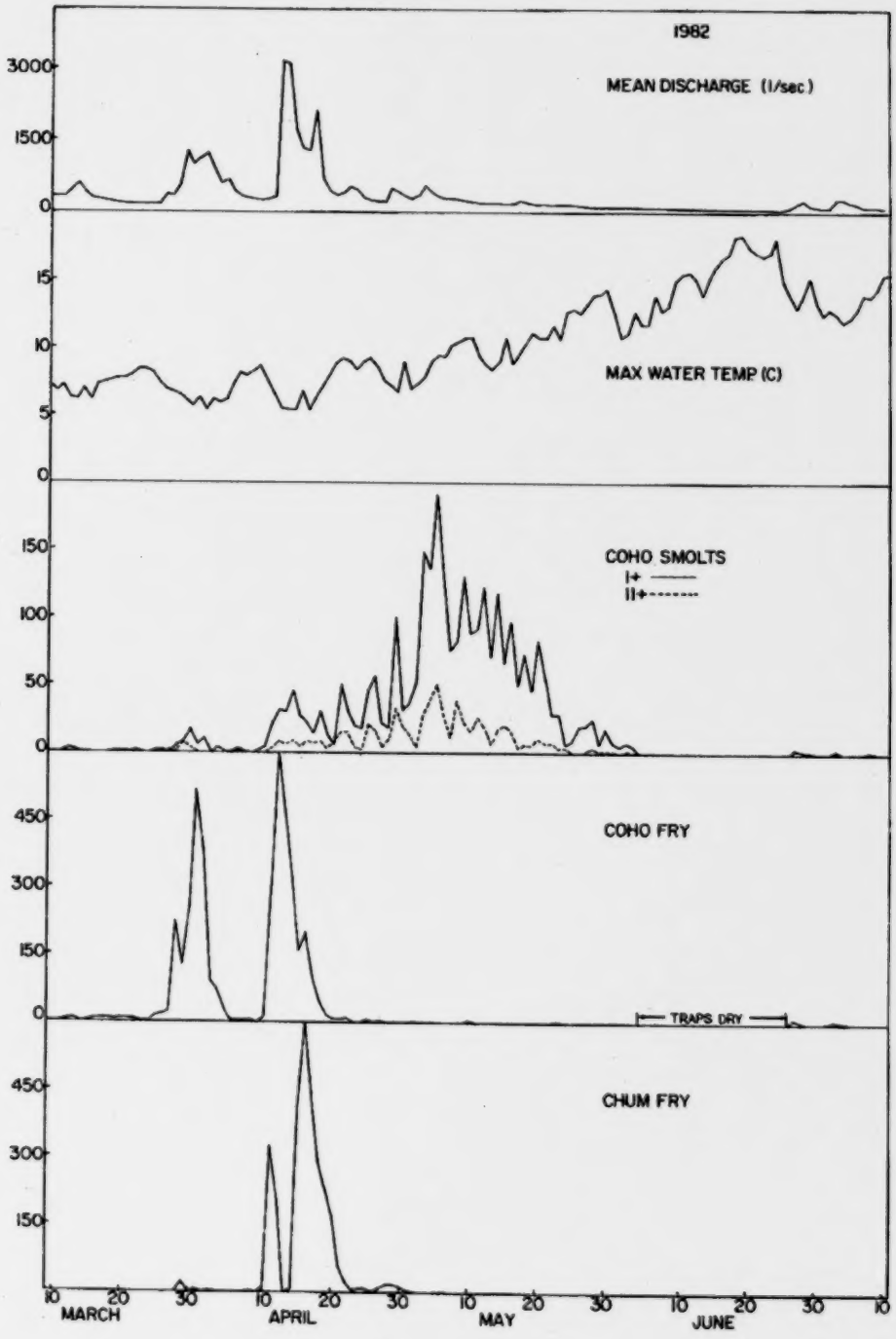


Fig. 4. Outmigration of juvenile salmonids in Carnation Creek in relation to date, water temperature and discharge, 1982.

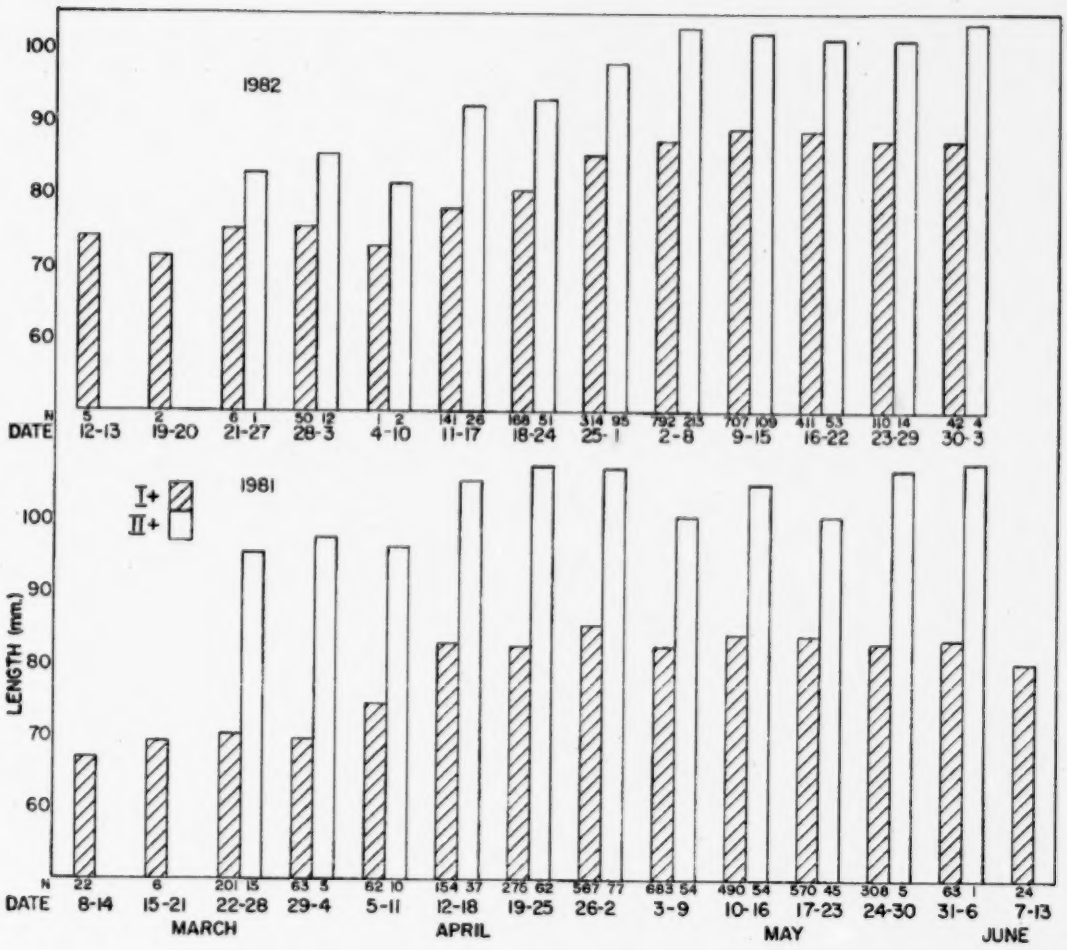


Fig. 5. Weekly mean lengths of age I and II coho smolts (>59 mm) leaving Carnation Creek in 1981 and 1982.

APPENDIX TABLES

Appendix table I. Carnation Creek coho.

Appendix table II. Carnation Creek Rainbow.

Appendix table III. Carnation Creek Cutthroat.

Appendix table IV. Carnation Creek Cottus Aleuticus.

Appendix table V. Carnation Creek Cottus Asper.

Appendix table VI. Upper Carnation Creek (IX) Cutthroat.

Appendix table VII. Carnation Creek Tributary C Cutthroat.

Appendix table VIII. South Pachena Fish.

Appendix table IX. Useless Creek Fish.

Appendix table X. Ritherdon Creek Cutthroat.

Appendix table XI. Fish Length Data.

Appendix table XII. Fish Length-Weight Data and Condition Factor (K).

APPENDIX I. CARNATION CREEK COHO

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
MAY 20-22/81																				
II	0	381	54	67	93	9	103	1.4	101	105	0.90	1.39	50.0	0.27	1.89	0.32	143.1	0.38	2.63	0.44
	I				6	3	12	36.0	0	24	0.50	5.77	80.2	0.03	0.22	0.04	69.2	0.18	1.27	0.21
III	0	275	14	55	61	24	101	97.2	81	120	0.61	1.48	50.9	0.37	7.34	0.39	148.8	0.54	10.86	0.57
	I				22	7	32	13.6	25	40	0.68	5.08	76.2	0.12	2.36	0.12	163.9	0.60	11.96	0.63
IV	0	324	104	49	230	62	315	74.5	298	332	0.73	0.95	44.2	0.97	3.02	1.43	299.1	0.92	2.87	1.36
	I				38	11	53	16.1	45	62	0.71	3.45	65.3	0.17	0.51	0.24	184.5	0.57	1.77	0.84
V	0	325	51	56	59	17	83	24.6	73	93	0.71	1.05	46.6	0.26	1.63	0.30	87.0	0.27	1.71	0.32
	I				24	8	36	18.0	28	44	0.67	3.60	66.3	0.11	0.71	0.13	129.6	0.40	2.55	0.47
VI	0	426	61	61	90	28	131	50.7	116	145	0.69	0.86	43.7	0.31	2.14	0.36	112.4	0.26	1.84	0.31
	I				10	12						4.12	68.7							
VIII	0	202	54	63	26	8	38	14.0	30	45	0.69	1.18	48.4	0.19	0.70	0.25	44.3	0.22	0.83	0.30
	I				26	11	45	59.8	30	61	0.58	4.32	70.1	0.22	0.84	0.30	194.7	0.96	3.64	1.31
ALL	0	1933	338	351	559	148	760	169.6	734	786	0.74	1.08	46.2	0.39	2.25	0.48	824.2	0.43	2.44	0.52
	I				126	52	215	254.8	183	246	0.59	4.12	69.4	0.11	0.64	0.13	884.7	0.46	2.62	0.55
JULY 27-30/81																				
II	0	324	23	71	78	18	101	14.6	94	109	0.77	3.26	65.5	0.31	4.37	0.34	330.6	1.02	14.25	1.10
	I				6	0	6	0.0	6	6	1.00	7.14	84.3	0.02	0.26	0.02	42.8	0.13	1.83	0.14
III	0	262	20	55	98	13	113	3.5	109	117	0.87	3.44	66.5	0.43	5.68	0.47	388.7	1.49	19.53	1.61
	I				17	1	18	0.1	17	19	0.94	7.41	85.4	0.07	0.91	0.07	133.8	0.51	6.73	0.55
IV	0	335	58	55	252	53	319	34.7	307	331	0.79	2.26	57.6	0.95	5.49	1.15	721.2	2.15	12.41	2.60
	I				33	10	47	16.7	39	56	0.70	5.77	76.4	0.14	0.81	0.17	273.2	0.81	4.70	0.99
V	0	280	39	55	121	10	132	1.3	130	134	0.92	2.53	61.1	0.47	3.42	0.55	333.7	1.19	8.65	1.38
	I				16	6	26	20.3	17	35	0.63	5.48	79.5	0.09	0.66	0.11	140.3	0.50	3.63	0.58
VI	0	362	33	60	71	23	105	47.2	91	119	0.68	2.28	59.1	0.29	3.18	0.32	239.4	0.66	7.26	0.73
	I				7	6	49	22932.0	-254	352	0.14	5.43	79.2	0.14	1.48	0.15	266.1	0.73	8.06	0.81
VIII	0	229	37	77	58	20	89	50.3	74	103	0.66	3.04	64.9	0.39	2.41	0.46	269.1	1.18	7.31	1.40
	I				18	8	32	53.9	18	47	0.56	5.66	81.3	0.14	0.88	0.17	183.4	0.80	4.98	0.96
ALL	0	1792	210	373	678	137	850	82.1	832	868	0.80	2.66	61.2	0.47	4.05	0.54	2259.2	1.26	10.78	1.43
	I				97	31	143	61.0	127	158	0.68	5.96	79.8	0.08	0.68	0.09	849.4	0.47	4.05	0.54

APPENDIX I. CARNATION CREEK COHO

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
SEP. 15 - OCT. 14/81																				
II	0	452	31	69	49	11	63	8.4	57	69	0.78	5.18	77.7	0.14	2.03	0.15	327.3	0.72	10.49	0.78
	I				6	1	7	0.4	6	8	0.83	9.56	94.1	0.02	0.23	0.02	68.8	0.15	2.21	0.16
III	0	255	10	55	93	14	109	4.7	105	114	0.85	4.27	72.3	0.43	10.73	0.45	467.5	1.83	45.83	1.91
	I				7	0	7	0.0	7	7	1.00	9.43	93.4	0.03	0.69	0.03	66.0	0.26	6.47	0.27
IV	0	358	57	55	229	46	287	27.2	276	297	0.80	2.71	61.7	0.80	5.01	0.95	776.6	2.17	13.58	2.59
	I				22	7	32	13.6	25	40	0.68	5.38	79.5	0.09	0.56	0.11	173.6	0.49	3.03	0.58
V	0	283	46	59	99	9	109	1.3	107	111	0.91	3.14	65.7	0.38	2.37	0.46	341.9	1.21	7.45	1.44
	I				17	1	18	0.1	17	19	0.94	5.66	79.9	0.06	0.39	0.08	102.2	0.36	2.23	0.43
VI	0	337	18	57	80	6	86	0.7	85	88	0.93	2.80	63.1	0.26	4.75	0.27	242.2	0.72	13.31	0.76
	I				9	1	10	0.2	9	11	0.89	5.26	78.4	0.03	0.56	0.03	53.3	0.16	2.93	0.17
VIII	0	217	34	77	59	5	64	0.7	63	66	0.92	3.56	68.6	0.30	1.90	0.35	229.5	1.06	6.75	1.26
	I				13	3	17	2.4	14	20	0.77	6.47	82.8	0.08	0.50	0.09	109.3	0.50	3.22	0.60
ALL	0	1902	197	372	609	91	716	29.9	705	727	0.85	3.32	66.1	0.38	3.64	0.42	2373.7	1.25	12.07	1.39
	I				74	13	90	5.8	85	95	0.82	6.29	82.4	0.05	0.46	0.05	564.4	0.30	2.87	0.33
MAY 25-28/82																				
II	0	394	20	70	172	23	199	6.2	194	204	0.87	1.05	45.7	0.50	10.18	0.53	208.5	0.53	10.69	0.56
	I				5	1	6	0.6	5	8	0.80	7.40	88.8	0.02	0.32	0.02	46.3	0.12	2.37	0.12
III	0	265	51	52	92	23	123	22.7	113	132	0.75	1.14	47.0	0.46	2.43	0.57	139.8	0.53	2.77	0.65
	I				6	1	7	0.4	6	8	0.83	6.87	83.4	0.03	0.14	0.03	49.3	0.19	0.98	0.23
IV	0	407	109	57	224	74	335	161.7	309	360	0.67	0.88	43.6	0.82	3.06	1.12	294.4	0.72	2.69	0.99
	I				9	3	14	6.8	8	19	0.67	6.13	75.8	0.03	0.12	0.05	82.8	0.20	0.76	0.28
V	0	296	50	55	52	17	77	35.9	65	89	0.67	1.08	47.1	0.26	1.53	0.31	83.4	0.28	1.66	0.34
	I				3	0	3	0.0	3	3	1.00	5.11	77.7	0.01	0.06	0.01	15.3	0.05	0.30	0.06
VI	0	316	68	64	170	31	208	15.0	200	216	0.82	0.89	44.3	0.66	3.05	0.84	185.0	0.59	2.72	0.75
VIII	0	341	65	89	95	33	146	85.1	127	164	0.65	0.87	43.5	0.43	2.23	0.53	126.6	0.37	1.94	0.46
	I				7	1	8	0.3	7	9	0.86	5.46	79.1	0.02	0.13	0.03	44.6	0.13	0.68	0.16
ALL	0	2019	363	387	805	201	1073	197.9	1045	1101	0.75	0.96	44.8	0.53	2.95	0.65	1026.9	0.51	2.83	0.62
	I				30	6	38	3.5	34	41	0.80	6.25	80.3	0.02	0.10	0.02	234.4	0.12	0.65	0.14

APPENDIX I. CARNATION CREEK COHO

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
JULY 26-28/82																				
II	0	303	3	69	131	14	147	2.6	143	150	0.89	2.36	60.4	0.48	48.89	0.49	346.2	1.14	115.38	1.15
	I				1	2						7.73	89.0							
III	0	248	24	52	153	11	165	1.1	163	167	0.93	2.75	63.6	0.66	6.90	0.74	453.3	1.83	18.97	2.02
	I				4	1	5	1.0	3	7	0.75	9.87	95.2	0.02	0.22	0.02	52.6	0.21	2.20	0.23
IV	0	307	15	56	292	42	341	12.9	334	348	0.86	2.03	57.4	1.11	22.89	1.17	692.3	2.25	46.47	2.37
	I				4	0	4	0.0	4	4	1.00	7.15	86.8	0.01	0.27	0.01	28.6	0.09	1.92	0.10
V	0	280	21	59	92	15	110	5.8	105	115	0.84	3.45	67.6	0.39	5.34	0.42	379.2	1.35	18.41	1.46
	I				5	2	8	8.6	2	14	0.60	7.28	86.6	0.03	0.40	0.03	60.7	0.22	2.94	0.23
VI	0	243	26	64	173	8	181	0.5	180	183	0.95	2.46	60.4	0.75	6.92	0.84	446.2	1.83	17.03	2.06
VIII	0	320	53	94	183	18	203	2.9	200	206	0.90	2.41	59.7	0.63	3.82	0.76	489.1	1.53	9.21	1.83
	I				8	0	8	0.0	8	8	1.00	7.02	85.5	0.02	0.15	0.03	56.2	0.18	1.06	0.21
ALL	0	1702	142	394	1024	108	1145	19.7	1136	1154	0.89	2.45	60.5	0.67	8.08	0.73	2801.2	1.65	19.77	1.80
	I				22	5	28	3.9	25	32	0.77	7.71	88.2	0.02	0.20	0.02	219.6	0.13	1.55	0.14

APPENDIX CARNATION CREEK COHO - EXTRA SECTIONS

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
JULY 29-31/82																				
400	0	291	43	55	168	15	184	2.1	182	187	0.91	2.29	59.8	0.63	4.27	0.75	422.4	1.45	9.78	1.71
950	0	280	43	48	244	25	272	4.4	268	276	0.90	1.91	56.4	0.97	6.35	1.15	519.2	1.85	12.13	2.19
	I				4	1	5	1.0	3	7	0.75	6.52	84.4	0.02	0.12	0.02	34.8	0.12	0.81	0.15
1400	0	344	25	77	129	4	133	0.1	132	134	0.97	2.76	63.9	0.39	5.33	0.42	367.4	1.07	14.70	1.15
	I				4	0	4	0.0	4	4	1.00	7.73	88.5	0.01	0.16	0.01	30.9	0.09	1.24	0.10
1700	0	350	40	69	143	9	153	0.8	151	154	0.94	3.34	66.9	0.44	3.78	0.49	509.7	1.46	12.62	1.65
	I				3	0	3	0.0	3	3	1.00	6.82	84.7	0.01	0.07	0.01	20.5	0.06	0.51	0.07
2000	0	257	23	62	186	18	206	2.9	203	209	0.90	2.33	59.3	0.80	8.80	0.88	479.8	1.87	20.50	2.06
2700	0	196	55	58	80	4	84	0.3	83	85	0.95	3.06	64.8	0.43	1.53	0.60	257.7	1.31	4.69	1.82
	I				3	0	3	0.0	3	3	1.00	9.95	95.7	0.02	0.05	0.02	29.9	0.15	0.54	0.21
ALL	0	1718	230	369	950	75	1031	8.9	1025	1037	0.92	2.48	60.8	0.60	4.49	0.69	2555.9	1.49	11.12	1.72
	I				14	1	15	0.1	14	16	0.93	7.59	87.8	0.01	0.07	0.01	114.4	0.07	0.50	0.08

APPENDIX I. CARNATION CREEK COHO

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
SEP. 20-23/82																				
II	0	348	10	71	113	12	126	2.2	123	129	0.89	3.20	65.8	0.36	12.90	0.37	404.6	1.16	41.28	1.20
	I				3	0	3	0.0	3	3	1.00	8.09	90.3	0.01	0.31	0.01	24.3	0.07	2.48	0.07
III	0	244	27	52	128	7	135	0.5	134	137	0.95	3.57	68.1	0.56	5.00	0.62	483.4	1.98	17.84	2.23
	I				4	2	8	24.0	-2	18	0.50	9.89	96.0	0.03	0.30	0.04	79.1	0.32	2.92	0.37
IV	0	367	33	58	223	34	263	11.6	256	270	0.85	2.59	61.0	0.72	7.88	0.79	681.5	1.86	20.40	2.04
	I				0	2						8.25	91.0							
V	0	289	18	59	94	6	100	0.5	99	102	0.94	4.39	73.3	0.35	5.49	0.37	440.8	1.52	24.09	1.63
	I				4	0	4	0.0	4	4	1.00	8.53	90.8	0.01	0.22	0.01	34.1	0.12	1.86	0.13
VI	0	259	32	64	137	10	148	1.1	146	150	0.93	3.01	65.1	0.57	4.66	0.65	444.8	1.72	14.03	1.96
VIII	0	304	46	86	141	17	160	3.8	156	164	0.88	3.18	66.1	0.53	3.46	0.62	509.9	1.68	10.99	1.98
	I				10	1	11	0.2	10	12	0.90	8.24	89.5	0.04	0.24	0.04	91.6	0.30	1.97	0.36
ALL	0	1810	167	390	836	86	932	15.1	924	940	0.90	3.18	65.6	0.51	5.59	0.57	2962.8	1.64	17.77	1.80
	I				21	5	28	4.4	23	32	0.76	8.65	91.4	0.02	0.17	0.02	238.4	0.13	1.43	0.15
NOV. 23-25/82																				
III	0	257	109	48	23	7	33	11.9	26	40	0.70	3.69	68.3	0.13	0.30	0.22	122.0	0.47	1.12	0.82
	I				0	1						11.67	102.0							
IV	0	408	113	52	33	7	42	4.7	38	46	0.79	3.00	64.6	0.10	0.37	0.14	125.7	0.31	1.11	0.43
	I				1	1						9.11	94.0							
V	0	305	27	49	16	3	20	1.5	17	22	0.81	3.95	70.7	0.06	0.73	0.07	77.8	0.26	2.90	0.28
VI	0	323	65	66	13	3	17	2.4	14	20	0.77	4.01	70.8	0.05	0.26	0.07	67.8	0.21	1.04	0.26
VIII	0	347	103	85	4	5						3.84	69.9							

APPENDIX II. CARNATION CREEK RAINBOW

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
MAY 20-22/81																				
VI & VIII	I	629	115	124	11	5	20	37.3	8	32	0.55	5.54	76.8	0.03	0.18	0.04	111.7	0.18	0.97	0.22
	II				3	0	3	0.0	3	3	1.00	18.49	122.7	0.00	0.03	0.01	55.5	0.09	0.48	0.11

APPENDIX II. CARNATION CREEK RAINBOW

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
JULY 27-30/81																				
VI	0	362	33	60	122	38	177	69.1	161	194	0.69	1.36	51.2	0.49	5.37	0.54	241.0	0.67	7.30	0.73
	I				7	2	10	2.8	6	13	0.71	8.62	92.4	0.03	0.30	0.03	84.5	0.23	2.56	0.26
	II				1	0	1	0.0	1	1	1.00	24.57	135.0	0.00	0.03	0.00	24.6	0.07	0.74	0.07
VIII	0	229	37	77	30	10	45	22.5	36	54	0.67	1.84	57.0	0.20	1.22	0.23	82.8	0.36	2.25	0.43
	I				4	3	16	1008.0	-47	79	0.25	11.58	101.9	0.07	0.43	0.08	185.3	0.81	5.03	0.97
	II				1	0	1	0.0	1	1	1.00	24.57	135.0	0.00	0.03	0.01	24.6	0.11	0.67	0.13
ALL	0	1792	210	373	163	53	242	110.1	221	263	0.67	1.48	52.7	0.13	1.15	0.15	358.4	0.20	1.71	0.23
	I				16	5	23	9.2	17	29	0.69	10.10	97.2	0.01	0.11	0.01	235.0	0.13	1.12	0.15
	II				3	0	3	0.0	3	3	1.00	28.05	142.0	0.00	0.01	0.00	84.1	0.05	0.40	0.05
	III				1	0	1	0.0	1	1	1.00	70.00	191.0	0.00	0.00	0.00	70.0	0.04	0.33	0.04
SEP. 15 - OCT. 14/81																				
VI	0	337	18	57	145	18	166	4.3	161	170	0.88	2.69	64.1	0.49	9.10	0.52	445.3	1.32	24.47	1.40
	I				8	1	9	0.2	8	10	0.88	10.17	98.9	0.03	0.50	0.03	93.0	0.28	5.11	0.29
	III				1	0	1	0.0	1	1	1.00	100.30	210.0	0.00	0.05	0.00	100.3	0.30	5.51	0.31
VIII	0	217	34	77	33	8	44	7.3	38	49	0.76	3.45	69.9	0.20	1.28	0.24	150.3	0.69	4.42	0.82
	I				2	0	2	0.0	2	2	1.00	10.31	100.0	0.01	0.06	0.01	20.6	0.10	0.61	0.11
ALL	0	1902	197	372	183	27	215	8.7	209	221	0.85	2.88	65.5	0.11	1.09	0.13	618.8	0.33	3.13	0.36
	I				13	1	14	0.1	13	15	0.92	11.02	100.6	0.01	0.07	0.01	155.2	0.08	0.79	0.09
	II				1	0	1	0.0	1	1	1.00	28.85	142.0	0.00	0.01	0.00	28.9	0.02	0.15	0.02
	III				1	0	1	0.0	1	1	1.00	100.30	210.0	0.00	0.01	0.00	100.3	0.05	0.51	0.06
MAY 25-28/82																				
ALL	I	2019	363	387	29	12	49	59.4	34	65	0.59	7.61	87.4	0.02	0.14	0.03	376.5	0.19	1.04	0.23
	II				6	2	9	4.5	5	13	0.67	22.73	129.6	0.00	0.02	0.01	204.6	0.10	0.56	0.12
JULY 26-28/82																				
VIII	0	320	53	94	109	24	140	17.4	131	148	0.78	1.21	48.3	0.44	2.63	0.52	169.1	0.53	3.19	0.63
	I				14	2	16	0.6	15	18	0.86	11.44	105.4	0.05	0.31	0.06	186.9	0.58	3.52	0.70
	II				1	1						20.98	132.0							
ALL	0	1702	142	394	113	26	147	20.9	138	156	0.77	1.19	48.1	0.09	1.04	0.09	174.7	0.10	1.23	0.11
	I				29	9	42	16.2	34	50	0.69	11.64	104.4	0.02	0.30	0.03	489.5	0.29	3.45	0.31
	II				2	3						24.93	139.0							

APPENDIX II. CARNATION CREEK RAINBOW - EXTRA SECTIONS

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
JULY 29-31/82																				
2700	0	196	55	58	172	51	244	80.0	227	262	0.70	0.78	43.0	1.25	4.45	1.73	190.7	0.97	3.47	1.35
	I				18	0	18	0.0	18	18	1.00	11.67	106.4	0.09	0.33	0.13	210.1	1.07	3.82	1.49
	II				4	1	5	1.0	3	7	0.75	21.00	131.8	0.03	0.10	0.04	112.0	0.57	2.04	0.79
ALL	0	1718	230	369	205	59	288	85.0	269	306	0.71	0.76	42.8	0.17	1.25	0.19	218.8	0.13	0.95	0.15
	I				38	8	48	5.2	44	53	0.79	12.03	105.8	0.03	0.21	0.03	579.0	0.34	2.52	0.39
	II				7	3	12	17.2	4	21	0.57	20.46	130.5	0.01	0.05	0.01	250.6	0.15	1.09	0.17

APPENDIX II CARNATION CREEK RAINBOW

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
SEP. 20-23/82																				
VIII	0	304	46	86	98	22	126	16.7	118	135	0.78	2.65	64.0	0.42	2.72	0.49	334.9	1.10	7.22	1.30
	I				17	5	24	7.7	19	30	0.71	13.62	109.5	0.08	0.52	0.09	328.0	1.08	7.07	1.27
	II				0	1						25.53	141.0							
ALL	0	1810	167	390	107	22	135	13.7	127	142	0.79	2.71	64.5	0.07	0.81	0.08	365.0	0.20	2.19	0.22
	I				29	10	44	25.2	34	54	0.66	13.89	110.6	0.02	0.27	0.03	614.8	0.34	3.69	0.37
	II				5	1	6	0.6	5	8	0.80	31.43	148.5	0.00	0.04	0.00	196.4	0.11	1.18	0.12

APPENDIX III CARNATION CREEK CUTTHROAT

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
MAY 20-22/81																				
ALL	I	1933	338	351	3	2	9	180.0	-18	36	0.33	6.22	79.6	0.00	0.03	0.01	56.0	0.03	0.17	0.04
	II				2	3						9.50	113.6							
	III				1	1						27.20	141.0							

APPENDIX III. CARNATION CREEK CUTTHROAT

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
JULY 27-30/81																				
ALL	I	1792	210	373	14	5	22	14.2	14	29	0.64	9.91	97.7	0.01	0.10	0.01	215.8	0.12	1.03	0.14
	II				4	1	5	1.0	3	7	0.75	28.97	138.2	0.00	0.03	0.00	154.5	0.09	0.74	0.10
	III				1	0	1	0.0	1	1	1.00	53.92	185.0	0.00	0.00	0.00	53.9	0.03	0.26	0.03
SEP. 15 - OCT. 14/81																				
ALL	0	1902	197	372	1	0	1	0.0	1	1	1.00	2.74	63.0	0.00	0.01	0.00	2.7	0.00	0.01	0.00
	I				12	4	18	9.0	12	24	0.67	9.68	96.7	0.01	0.09	0.01	174.2	0.09	0.89	0.10
	II				1	4						26.93	139.6							
	III				0	2						100.76	230.0							
MAY 25-28/82																				
ALL	I	2019	363	387	4	1	5	1.0	3	7	0.75	7.66	91.6	0.00	0.01	0.00	40.9	0.02	0.11	0.02
	II				5	1	6	0.6	5	8	0.80	17.58	118.3	0.00	0.02	0.00	109.9	0.05	0.30	0.07
	III				3	0	3	0.0	3	3	1.00	53.86	182.3	0.00	0.01	0.00	161.6	0.08	0.45	0.10
	IV				2	0	2	0.0	2	2	1.00	124.14	254.0	0.00	0.01	0.00	248.3	0.12	0.68	0.15
JULY 26-28/82																				
ALL	0	1702	142	394	2	3						0.38	36.6							
	I				10	1	11	0.2	10	12	0.90	11.21	107.8	0.01	0.08	0.01	124.6	0.07	0.88	0.08
	II				2	1	4	12.0	-3	11	0.50	48.22	171.7	0.00	0.03	0.00	192.9	0.11	1.36	0.12
	III				3	0	3	0.0	3	3	1.00	91.80	217.0	0.00	0.02	0.00	275.4	0.16	1.94	0.18

APPENDIX III CARNATION CREEK CUTTHROAT - EXTRA SECTIONS

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
JULY 29-31/82																				
ALL	I	1718	230	369	5	1	6	0.6	5	8	0.80	10.33	104.8	0.00	0.03	0.00	64.6	0.04	0.28	0.04
	II				6	2	9	4.5	5	13	0.67	35.57	155.4	0.01	0.04	0.01	320.1	0.19	1.39	0.22
	III				2	0	2	0.0	2	2	1.00	109.07	229.0	0.00	0.01	0.00	218.1	0.13	0.95	0.15

APPENDIX III. CARNATION CREEK CUTTHROAT

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
SEP. 20-23/82																				
ALL	0	1810	167	390	6	0	6	0.0	6	6	1.00	0.88	44.3	0.00	0.04	0.00	5.3	0.00	0.03	0.00
	I				7	1	8	0.3	7	9	0.86	10.99	106.9	0.00	0.05	0.00	89.8	0.05	0.54	0.05
	II				7	2	10	2.8	6	13	0.71	43.10	165.0	0.01	0.06	0.01	422.4	0.23	2.53	0.26
	III				2	0	2	0.0	2	2	1.00	92.33	217.5	0.00	0.01	0.00	184.7	0.10	1.11	0.11

APPENDIX IV. CARNATION CREEK COTTUS ALEUTICUS

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
MAY 20-22/81																				
II	ALL	381	54	67	49	13	67	15.0	59	74	0.73	3.54	66.5	0.18	1.23	0.20	236.1	0.62	4.34	0.72
III	ALL	275	14	55	2	7						7.65	85.8							
IV	ALL	324	104	49	5	4	25	3600.0	-95	145	0.20	8.98	88.2	0.08	0.24	0.11	224.5	0.69	2.16	1.02
V	ALL	325	51	56	6	1	7	0.4	6	8	0.83	6.69	82.0	0.02	0.14	0.03	48.2	0.15	0.95	0.18
VI	ALL	426	61	61	8	4	16	48.0	2	30	0.50	10.38	93.9	0.04	0.26	0.04	166.1	0.39	2.72	0.45
VIII	ALL	202	54	63	8	1	9	0.2	8	10	0.88	6.12	80.8	0.05	0.17	0.06	56.0	0.28	1.05	0.38
ALL	ALL	1933	338	351	78	30	127	111.4	106	148	0.62	5.52	75.2	0.07	0.38	0.08	699.0	0.36	2.07	0.44
JULY 27-30/81																				
II	ALL	324	23	71	55	18	82	38.2	69	94	0.67	3.60	67.3	0.25	3.52	0.27	294.3	0.91	12.69	0.98
III	ALL	262	20	55	4	3	16	1008.0	-47	79	0.25	6.90	85.4	0.06	0.80	0.07	110.4	0.42	5.55	0.46
IV	ALL	335	58	55	6	4	18	360.0	-20	56	0.33	7.81	90.6	0.05	0.31	0.06	140.6	0.42	2.42	0.51
V	ALL	280	39	55	10	2	13	1.2	10	15	0.80	7.87	85.4	0.04	0.32	0.05	98.4	0.35	2.55	0.41
VI	ALL	362	33	60	4	2	8	24.0	-2	18	0.50	8.29	89.2	0.02	0.24	0.02	66.3	0.18	2.01	0.20
VIII	ALL	229	37	77	6	8						9.98	93.5							
ALL	ALL	1792	210	373	85	37	151	227.3	120	181	0.56	5.52	76.1	0.08	0.72	0.10	830.5	0.46	3.96	0.52
SEP. 15 - OCT. 14/81																				
II	ALL	452	31	69	57	44	250	22243.5	-48	548	0.23	3.42	66.8	0.55	8.01	0.59	854.7	1.89	27.40	2.03
III	ALL	255	10	55	4	5						7.28	82.6							
IV	ALL	358	57	55	6	1	7	0.4	6	8	0.83	7.62	88.0	0.02	0.13	0.02	54.9	0.15	0.96	0.18
V	ALL	283	46	59	6	4	18	360.0	-20	56	0.33	12.69	98.5	0.06	0.39	0.08	228.4	0.81	4.98	0.96
VI	ALL	337	18	57	5	2	8	8.6	2	14	0.60	9.91	92.6	0.02	0.46	0.03	82.6	0.24	4.54	0.26
VIII	ALL	217	34	77	5	1	6	0.6	5	8	0.80	7.99	86.5	0.03	0.18	0.03	49.9	0.23	1.47	0.27
ALL	ALL	1902	197	372	83	57	265	6857.1	99	431	0.31	5.06	73.3	0.14	1.35	0.16	1340.9	0.70	6.82	0.79

APPENDIX IV. CARNATION CREEK COTTUS ALEUTICUS

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
MAY 25-28/82																				
II	ALL	394	20	70	80	27	121	63.3	105	137	0.66	3.05	64.5	0.31	6.19	0.32	368.3	0.93	18.89	0.98
III	ALL	265	51	52	6	4	18	360.0	-20	56	0.33	13.17	102.2	0.07	0.36	0.08	237.1	0.90	4.69	1.11
IV	ALL	407	109	57	7	4	16	106.5	-4	37	0.43	10.59	100.5	0.04	0.15	0.05	173.0	0.42	1.58	0.58
V	ALL	296	50	55	12	7	29	214.5	0	58	0.42	13.83	96.3	0.10	0.57	0.12	398.3	1.35	7.90	1.62
VI	ALL	316	68	64	6	4	18	360.0	-20	56	0.33	9.27	89.0	0.06	0.26	0.07	166.9	0.53	2.45	0.67
VIII	ALL	341	65	89	9	3	14	6.8	8	19	0.67	10.73	96.8	0.04	0.21	0.05	144.9	0.42	2.22	0.53
ALL	ALL	2019	363	387	120	49	203	229.9	172	233	0.59	6.26	76.4	0.10	0.56	0.12	1270.6	0.63	3.50	0.77
JULY 26-28/82																				
II	ALL	303	3	69	143	48	215	110.5	194	236	0.66	2.19	58.5	0.71	71.75	0.72	471.4	1.56	157.13	1.57
III	ALL	248	24	52	16	4	21	4.0	17	25	0.75	4.22	70.6	0.09	0.89	0.10	90.0	0.36	3.77	0.40
IV	ALL	307	15	56	10	5	20	60.0	5	35	0.50	6.24	83.1	0.07	1.34	0.07	124.8	0.41	8.38	0.43
V	ALL	280	21	59	4	5						10.51	99.3							
VI	ALL	243	26	64	4	3	16	1008.0	-47	79	0.25	7.21	85.7	0.07	0.61	0.07	115.4	0.47	4.40	0.53
VIII	ALL	320	53	94	18	7	29	27.1	19	40	0.61	10.97	100.2	0.09	0.55	0.11	323.1	1.01	6.09	1.21
ALL	ALL	1702	142	394	195	72	309	229.9	279	339	0.63	3.80	66.8	0.18	2.18	0.20	1175.9	0.69	8.30	0.75

APPENDIX IV. CARNATION CREEK COTTUS ALEUTICUS - EXTRA SECTIONS

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
JULY 29-31/82																				
400	ALL	291	43	55	159	52	236	110.0	215	257	0.67	1.85	55.8	0.81	5.47	0.95	437.1	1.50	10.12	1.77
950	ALL	280	43	48	18	15	108	29700.0	-237	453	0.17	5.47	79.1	0.39	2.52	0.46	590.8	2.11	13.80	2.49
1400	ALL	344	25	77	15	6	25	25.9	15	35	0.60	6.79	86.8	0.07	1.00	0.08	169.8	0.49	6.79	0.53
1700	ALL	350	40	69	15	6	25	25.9	15	35	0.60	8.40	91.7	0.07	0.62	0.08	210.0	0.60	5.20	0.68
2000	ALL	257	23	62	14	3	18	2.0	15	21	0.79	6.73	85.4	0.07	0.76	0.08	119.9	0.47	5.12	0.51
2700	ALL	196	55	58	3	2	9	180.0	-18	36	0.33	9.84	97.0	0.05	0.16	0.06	88.6	0.45	1.61	0.63
ALL	ALL	1718	230	369	224	84	358	283.9	325	392	0.63	3.42	65.2	0.21	1.56	0.24	1225.8	0.71	5.33	0.82

APPENDIX IV. CARNATION CREEK COTTUS ALEUTICUS

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
SEP. 20-23/82																				
II	ALL	348	10	71	111	25	143	19.1	135	152	0.77	2.61	61.9	0.41	14.62	0.42	373.9	1.07	38.16	1.11
III	ALL	244	27	52	10	5	20	60.0	5	35	0.50	5.45	79.5	0.08	0.74	0.09	109.0	0.45	4.02	0.50
IV	ALL	367	33	58	5	1	6	0.6	5	8	0.80	7.58	91.7	0.02	0.19	0.02	47.4	0.13	1.42	0.14
V	ALL	289	18	59	11	9	61	12251.3	-161	282	0.18	8.34	88.0	0.21	3.31	0.22	504.6	1.74	27.57	1.86
VI	ALL	259	32	64	9	3	14	6.8	8	19	0.67	8.42	89.5	0.05	0.43	0.06	113.7	0.44	3.59	0.50
VIII	ALL	304	46	86	11	7	30	416.9	-11	71	0.36	10.74	97.4	0.10	0.65	0.12	324.9	1.07	7.00	1.26
ALL	ALL	1810	167	390	157	50	230	97.3	211	250	0.68	4.56	71.2	0.13	1.38	0.14	1049.8	0.58	6.30	0.64

APPENDIX V. CARNATION CREEK COTTUS ASPER

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
MAY 22/81																				
II	ALL	381	54	67	11	6	24	118.5	2	46	0.45	9.64	91.4	0.06	0.44	0.07	233.3	0.61	4.29	0.71
JULY 28/81																				
II	ALL	324	23	71	19	11	45	319.9	9	81	0.42	7.96	87.6	0.14	1.95	0.15	359.2	1.11	15.48	1.19
OCT. 14/81																				
II	ALL	452	31	69	14	9	39	584.2	-9	88	0.36	9.84	93.7	0.09	1.26	0.09	385.7	0.85	12.36	0.92
MAY 28/82																				
II	ALL	394	20	70	30	6	38	3.5	34	41	0.80	7.22	81.6	0.10	1.92	0.10	270.8	0.69	13.88	0.72
JULY 26-31/82																				
II	ALL	303	3	69	19	5	26	5.6	21	31	0.74	9.01	92.0	0.09	8.60	0.09	232.3	0.77	77.44	0.77
400	ALL	291	43	55	19	10	40	159.6	15	65	0.47	7.23	86.3	0.14	0.93	0.16	290.0	1.00	6.71	1.17
SEP. 22/82																				
II	ALL	348	10	71	15	5	23	11.3	16	29	0.67	9.38	94.1	0.06	2.30	0.07	211.1	0.61	21.54	0.62

APPENDIX VI. UPPER CARNATION(IX) CUTTHROAT

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
MAY 14/81																				
IX	I	298	109	72	29	12	49	59.4	34	65	0.59	5.32	67.9	0.17	0.46	0.26	263.2	0.88	2.43	1.39
	II				13	4	19	7.0	13	24	0.69	16.64	112.2	0.06	0.17	0.10	312.5	1.05	2.88	1.65
	III				4	0	4	0.0	4	4	1.00	34.71	144.0	0.01	0.04	0.02	138.8	0.47	1.28	0.73
SEP. 15/81																				
IX	0	219	27	71	44	18	74	85.1	56	93	0.59	2.34	48.1	0.34	2.75	0.39	174.2	0.79	6.43	0.91
	I				26	13	52	156.0	27	77	0.50	9.65	94.1	0.24	1.92	0.27	501.8	2.29	18.52	2.61
	II				2	0	2	0.0	2	2	1.00	25.17	143.0	0.01	0.07	0.01	50.3	0.23	1.86	0.26
MAY 29/82																				
IX	I	285	71	66	20	4	25	2.3	22	28	0.80	2.50	62.8	0.09	0.35	0.12	62.5	0.22	0.88	0.29
	II				23	11	44	105.0	24	65	0.52	14.42	109.9	0.15	0.62	0.21	635.7	2.23	8.97	2.97
	III				1	0	1	0.0	1	1	1.00	52.34	187.0	0.00	0.01	0.00	52.3	0.18	0.74	0.24
SEP. 21/82																				
IX	0	231	50	65	61	27	109	178.6	83	136	0.56	0.73	42.9	0.47	2.19	0.61	79.9	0.35	1.60	0.44
	I				34	10	48	15.3	40	56	0.71	8.84	93.7	0.21	0.96	0.27	425.8	1.84	8.52	2.36
	II				1	0	1	0.0	1	1	1.00	24.22	144.0	0.00	0.02	0.01	24.2	0.10	0.48	0.13

APPENDIX VII. CARNATION CREEK TRIBUTARY C CUTTHROAT

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
MAY 13/81																				
I	I	97	0	47	7	1	8	0.3	7	9	0.86	5.32	79.3	0.08	0.00	0.08	43.4	0.45	0.00	0.45
	II				4	0	4	0.0	4	4	1.00	16.64	118.8	0.04	0.00	0.04	66.6	0.69	0.00	0.69
	III				2	0	2	0.0	2	2	1.00	34.71	151.0	0.02	0.00	0.02	69.4	0.72	0.00	0.72
SEP. 14/81																				
I	0	63	34	47	35	4	40	0.8	38	41	0.89	2.34	59.5	0.63	1.18	1.36	92.5	1.48	2.76	3.19
	I				8	1	9	0.2	8	10	0.88	9.65	98.7	0.15	0.27	0.32	88.2	1.41	2.63	3.04
	II				3	0	3	0.0	3	3	1.00	25.17	137.0	0.05	0.09	0.10	75.5	1.21	2.25	2.60
MAY 28/82																				
I	I	94	46	50	7	2	10	2.8	6	13	0.71	4.35	73.1	0.10	0.21	0.20	42.6	0.45	0.93	0.88
	II				8	0	8	0.0	8	8	1.00	13.16	110.0	0.09	0.17	0.17	105.3	1.12	2.29	2.18
	III				1	0	1	0.0	1	1	1.00	41.79	164.0	0.01	0.02	0.02	41.8	0.44	0.91	0.87

APPENDIX VII. CARNATION CREEK TRIBUTARY C CUTTHROAT

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
SEP. 21/82																				
I	0	82	30	53	28	6	36	4.1	32	40	0.79	1.33	51.6	0.43	1.18	0.69	47.4	0.58	1.57	0.91
	I				11	4	17	12.1	10	24	0.64	9.06	96.5	0.21	0.57	0.33	156.6	1.91	5.20	3.02
	II				1	0	1	0.0	1	1	1.00	19.91	123.0	0.01	0.03	0.02	19.9	0.24	0.66	0.38
	III				1	0	1	0.0	1	1	1.00	91.38	200.0	0.01	0.03	0.02	91.4	1.11	3.04	1.76

APPENDIX VIII. SOUTH PACHENA CREEK COHO

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
AUG. 27/81																				
I	0	314	20	59	199	27	230	7.5	225	236	0.86	2.73	62.7	0.73	11.75	0.78	628.6	2.00	32.07	2.13
	I				7	2	10	2.8	6	13	0.71	7.41	86.6	0.03	0.50	0.03	72.6	0.23	3.70	0.25
AUG. 26/82																				
I	0	314	4	57	315	30	348	4.7	344	352	0.90	1.64	53.1	1.11	94.10	1.12	571.0	1.82	154.32	1.84
	I				8	1	9	0.2	8	10	0.88	10.70	100.3	0.03	2.47	0.03	97.8	0.31	26.44	0.32

APPENDIX VIII. SOUTH PACHENA CREEK RAINBOW

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
AUG. 27/81																				
I	0	314	20	59	15	1	16	0.1	15	17	0.93	2.25	60.9	0.05	0.82	0.05	36.2	0.12	1.84	0.12
	I				2	0	2	0.0	2	2	1.00	4.40	74.0	0.01	0.10	0.01	8.8	0.03	0.45	0.03
	II				1	0	1	0.0	1	1	1.00	20.81	128.0	0.00	0.05	0.00	20.8	0.07	1.06	0.07
AUG. 26/82																				
I	0	314	4	57	59	9	70	3.1	66	73	0.85	1.14	49.7	0.22	18.82	0.22	79.4	0.25	21.45	0.26
	II				3	0	3	0.0	3	3	1.00	37.59	157.3	0.01	0.81	0.01	112.8	0.36	30.48	0.36

APPENDIX VIII SOUTH PACHENA CREEK COTTUS ALEUTICUS

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
AUG. 27/81																				
I	ALL	314	20	59	30	9	43	14.6	35	51	0.70	3.79	69.9	0.14	2.19	0.15	162.4	0.52	8.29	0.55
AUG. 26/82																				
I	ALL	314	4	57	24	5	30	3.2	27	34	0.79	3.34	70.4	0.10	8.19	0.10	101.3	0.32	27.37	0.33

APPENDIX VIII. SOUTH PACHENA CREEK COTTUS ASPER

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
AUG. 27/81																				
I	ALL	314	20	59	32	11	49	27.4	38	59	0.66	8.18	88.7	0.16	2.49	0.17	398.9	1.27	20.35	1.35
AUG. 26/82																				
I	ALL	314	4	57	40	9	52	6.9	46	57	0.77	9.91	91.8	0.16	13.95	0.17	511.5	1.63	138.24	1.65

APPENDIX IX. USELESS CREEK COHO

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
AUG. 26/81																				
I	0	166	70	55	2	0	2	0.0	2	2	1.00	0.62	42.0	0.01	0.03	0.02	1.2	0.01	0.02	0.01
AUG. 25/82																				
I	0	142	66	51	5	2	8	8.6	2	14	0.60	3.28	64.9	0.06	0.13	0.11	27.3	0.19	0.41	0.36

APPENDIX IX. USELESS CREEK CUTTHROAT

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
AUG. 26/81																				
I	0	166	70	55	1	0	1	0.0	1	1	1.00	1.85	56.0	0.01	0.01	0.01	1.9	0.01	0.03	0.02
	I				9	0	9	0.0	9	9	1.00	5.93	83.4	0.05	0.13	0.09	53.4	0.32	0.77	0.56
	II				5	1	6	0.6	5	8	0.80	13.32	111.8	0.04	0.09	0.07	83.3	0.50	1.19	0.87
	III				1	0	1	0.0	1	1	1.00	47.00	167.0	0.01	0.01	0.01	47.0	0.28	0.67	0.49
AUG. 25/82																				
I	0	142	66	51	20	8	33	34.6	22	45	0.60	1.14	47.5	0.24	0.51	0.44	38.0	0.27	0.58	0.50
	I				5	0	5	0.0	5	5	1.00	7.83	92.4	0.04	0.08	0.07	39.2	0.28	0.59	0.52
	II				3	0	3	0.0	3	3	1.00	40.23	156.3	0.02	0.05	0.04	120.7	0.85	1.83	1.60
	III				1	0	1	0.0	1	1	1.00	78.77	194.0	0.01	0.02	0.01	78.8	0.56	1.19	1.04

APPENDIX IX. USELESS CREEK COTTUS ALEUTICUS

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
AUG. 26/81																				
I	ALL	166	70	55	32	16	64	192.0	36	92	0.50	3.64	65.6	0.39	0.92	0.67	233.0	1.41	3.34	2.43
AUG. 25/82																				
I	ALL	142	66	51	44	21	84	198.3	56	112	0.52	4.43	69.6	0.59	1.28	1.11	372.9	2.64	5.65	4.94

APPENDIX X. RITHERDON CREEK CUTTHROAT

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
AUG. 28/81																				
I	0	244	20	49	57	23	96	102.9	75	116	0.60	1.46	52.0	0.39	4.80	0.43	139.5	0.57	7.01	0.62
	I				11	4	17	12.1	10	24	0.64	15.21	113.3	0.07	0.87	0.08	262.9	1.08	13.21	1.18
	II				6	0	6	0.0	6	6	1.00	34.29	151.2	0.02	0.30	0.03	205.7	0.84	10.34	0.92
	III				3	0	3	0.0	3	3	1.00	79.97	198.0	0.01	0.15	0.01	239.9	0.99	12.06	1.07

APPENDIX X. RITHERDON CREEK CUTTHROAT

SEC	AGE	AREA (SQ.M) WET	AREA (SQ.M) RIF	SEC LEN (M)	C1	C2	POP N	VAR N	95 % CONF LIM LOW	95 % CONF LIM UP	P	MEAN WT (GM)	MEAN LEN (MM)	DENSITY FISH/SQ.M WET	DENSITY FISH/SQ.M RIF	DENSITY FISH/SQ.M POOL	WETTED TOT WT (GM)	GM./SQ.M WET	GM./SQ.M RIF	GM./SQ.M POOL
AUG. 24/82																				
I	0	231	18	52	74	25	112	58.8	96	127	0.66	1.15	48.5	0.48	6.21	0.53	128.5	0.56	7.14	0.60
	I				8	4	16	48.0	2	30	0.50	9.35	98.3	0.07	0.89	0.08	149.6	0.65	8.31	0.70
	II				8	1	9	0.2	8	10	0.88	39.34	158.0	0.04	0.51	0.04	359.7	1.56	19.98	1.69

APPENDIX XI. FISH LENGTH DATA FOR CARNATION CREEK AND OTHER AREA STREAMS

DATE	LOC	GEAR	SPEC	AGE	N	MEAN	SDEV	C.I.MIN	C.I.MAX	RANGE MIN	RANGE MAX
81 Mar 05	FENC	TR	PINK	0	34	33.41	1.158	33.01	33.81	31	36
81 Mar 12	FENC	TR	PINK	0	40	34.85	0.700	34.63	35.07	32	36
81 Mar 05	FENC	TR	CHUM	0	60	41.35	1.376	40.99	41.71	39	44
81 Mar 12	FENC	TR	CHUM	0	70	40.87	1.250	40.57	41.17	39	43
81 Mar 19	FENC	TR	CHUM	0	50	41.60	1.069	41.30	41.90	39	44
81 Mar 26	FENC	TR	CHUM	0	50	41.40	1.457	40.99	41.81	39	45
81 Apr 02	FENC	TR	CHUM	0	49	42.35	1.251	41.99	42.71	39	44
81 Apr 09	FENC	TR	CHUM	0	38	42.66	1.169	42.27	43.04	40	45
81 Apr 15	FENC	TR	CHUM	0	32	42.00	1.078	41.61	42.39	40	45
81 Mar 05	FENC	TR	COHO	0	109	36.06	1.765	35.73	36.40	31	40
81 Mar 12	FENC	TR	COHO	0	57	36.79	1.521	36.39	37.19	32	40
81 Mar 20	FENC	TR	COHO	0	60	37.70	0.908	37.47	37.93	36	40
81 Mar 26	FENC	TR	COHO	0	51	37.02	2.025	36.45	37.59	32	40
81 Apr 02	FENC	TR	COHO	0	50	37.42	1.416	37.02	37.82	34	41
81 Apr 09	FENC	TR	COHO	0	47	37.68	1.889	37.13	38.23	31	41
81 Apr 15	FENC	TR	COHO	0	25	37.72	1.969	36.91	38.53	33	41
81 Apr 29	FENC	TR	COHO	0	37	40.03	2.598	39.16	40.89	35	48
81 May 25	FENC	TR	COHO	0	23	48.30	4.967	46.16	50.45	38	58
81 Jun 06	FENC	TR	COHO	0	45	49.53	5.255	47.96	51.11	38	59
81 Jun 28	FENC	TR	COHO	0	38	57.84	3.866	56.58	59.11	51	65
81 Mar 11	FENC	TR	COHO	1	22	67.05	5.178	64.75	69.34	60	78
81 Mar 18	FENC	TR	COHO	1	6	69.17	9.538	59.16	79.17	61	85
81 Mar 25	FENC	TR	COHO	1	201	70.07	6.815	69.13	71.01	60	91
81 Mar 25	FENC	TR	COHO	2	15	95.27	12.887	88.15	102.39	76	123
81 Apr 01	FENC	TR	COHO	1	63	69.46	6.350	67.87	71.05	60	90
81 Apr 01	FENC	TR	COHO	2	5	97.60	14.011	80.18	115.02	77	114
81 Apr 08	FENC	TR	COHO	1	62	74.47	9.095	72.17	76.77	60	112
81 Apr 08	FENC	TR	COHO	2	10	97.20	6.125	92.82	101.58	87	106
81 Apr 15	FENC	TR	COHO	1	154	82.90	13.214	80.81	84.98	60	111
81 Apr 15	FENC	TR	COHO	2	37	105.54	10.098	102.19	108.89	85	126
81 Apr 22	FENC	TR	COHO	1	275	82.68	11.707	81.29	84.06	60	112
81 Apr 22	FENC	TR	COHO	2	62	107.61	7.947	105.60	109.62	96	126
81 Apr 29	FENC	TR	COHO	1	567	85.50	8.916	84.77	86.23	60	102
81 Apr 29	FENC	TR	COHO	2	77	107.17	5.056	106.02	108.32	100	126
81 May 06	FENC	TR	COHO	1	683	82.66	8.720	82.00	83.31	60	107
81 May 06	FENC	TR	COHO	2	54	100.63	7.326	98.64	102.62	92	114
81 May 13	FENC	TR	COHO	1	490	84.23	7.090	83.61	84.86	65	100
81 May 13	FENC	TR	COHO	2	54	105.11	6.561	103.33	106.90	96	126
81 May 20	FENC	TR	COHO	1	570	83.97	6.663	83.43	84.52	64	100
81 May 20	FENC	TR	COHO	2	45	100.67	8.113	98.24	103.10	88	117
81 May 27	FENC	TR	COHO	1	308	83.03	6.843	82.27	83.80	60	100
81 May 27	FENC	TR	COHO	2	5	107.00	4.183	101.80	112.20	103	114
81 Jun 03	FENC	TR	COHO	1	63	83.62	8.429	81.51	85.73	62	103
81 Jun 03	FENC	TR	COHO	2	1	108.00					
81 Jun 10	FENC	TR	COHO	1	24	80.17	11.270	75.40	84.93	60	95
81 May 22	2	SPS	COHO	0	102	49.98	3.776	49.24	50.72	41	61
81 May 22	2	SPS	COHO	1	9	80.22	9.484	72.92	87.52	65	95
81 May 22	3	SPS	COHO	0	85	50.92	4.531	49.94	51.90	42	64

APPENDIX XI. FISH LENGTH DATA FOR CARNATION CREEK AND OTHER AREA STREAMS

DATE	LOC	GEAR	SPEC	AGE	N	MEAN	SDEV	C.I.MIN	C.I.MAX	RANGE MIN	RANGE MAX
81 May 22	3	SPS	COHO	1	29	76.24	8.480	73.01	79.47	66	96
81 May 20	4	SPS	COHO	0	292	44.16	3.271	43.79	44.54	36	55
81 May 20	4	SPS	COHO	1	49	65.35	5.914	63.65	67.05	57	85
81 May 20	5	SPS	COHO	0	76	46.58	3.732	45.73	47.43	36	54
81 May 20	5	SPS	COHO	1	32	66.25	7.531	63.55	68.95	55	83
81 May 21	6	SPS	COHO	0	118	43.65	4.450	42.84	44.46	33	57
81 May 21	6	SPS	COHO	1	22	68.73	8.708	64.87	72.59	55	86
81 May 21	8	SPS	COHO	0	34	48.44	3.286	47.30	49.59	41	55
81 May 21	8	SPS	COHO	1	37	70.14	7.052	67.79	72.48	60	90
81 Jul 28	2	SPS	COHO	0	96	65.52	4.799	64.55	66.49	55	77
81 Jul 28	2	SPS	COHO	1	6	84.33	3.327	80.84	87.82	79	88
81 Jul 27	3	SPS	COHO	0	111	66.50	6.146	65.34	67.65	54	80
81 Jul 27	3	SPS	COHO	1	18	85.44	7.846	81.54	89.35	72	104
81 Jul 29	4	SPS	COHO	0	305	57.62	4.981	57.06	58.18	43	69
81 Jul 29	4	SPS	COHO	1	43	76.37	4.624	74.95	77.79	69	90
81 Jul 29	5	SPS	COHO	0	131	61.06	5.563	60.11	62.01	40	73
81 Jul 29	5	SPS	COHO	1	22	79.55	5.422	77.14	81.95	73	92
81 Jul 30	6	SPS	COHO	0	94	59.09	5.447	57.97	60.20	47	70
81 Jul 30	6	SPS	COHO	1	13	79.15	4.038	76.71	81.60	73	87
81 Jul 28	8	SPS	COHO	0	78	64.87	4.793	63.79	65.95	55	76
81 Jul 28	8	SPS	COHO	1	26	81.27	4.670	79.38	83.16	75	95
81 Oct 14	2	SPS	COHO	0	60	77.65	5.028	76.35	78.95	67	87
81 Oct 14	2	SPS	COHO	1	7	94.14	5.080	89.44	98.85	88	101
81 Sep 15	3	SPS	COHO	0	107	72.31	6.474	71.07	73.55	60	86
81 Sep 15	3	SPS	COHO	1	7	93.43	7.390	86.58	100.27	87	109
81 Sep 16	4	SPS	COHO	0	275	61.73	4.684	61.18	62.29	50	73
81 Sep 16	4	SPS	COHO	1	29	79.48	3.870	78.01	80.96	73	89
81 Sep 16	5	SPS	COHO	0	108	65.72	4.718	64.82	66.62	53	77
81 Sep 16	5	SPS	COHO	1	18	79.89	5.132	77.34	82.44	73	89
81 Sep 17	6	SPS	COHO	0	86	63.09	4.901	62.04	64.14	51	72
81 Sep 17	6	SPS	COHO	1	10	78.40	4.742	75.01	81.79	72	86
81 Sep 17	8	SPS	COHO	0	64	68.63	4.399	67.53	69.72	60	78
81 Sep 17	8	SPS	COHO	1	16	82.75	5.916	79.60	85.90	75	96
81 May 21	6	SPS	RBT	1	14	77.36	6.879	73.39	81.33	66	92
81 May 21	8	SPS	RBT	1	2	72.50	14.849	-60.96	205.96	62	83
81 May 21	8	SPS	RBT	2	3	122.67	10.693	96.12	149.21	116	135
81 May 21	TOTL	SPS	RBT	1	16	76.75	7.646	72.68	80.82	62	92
81 May 21	TOTL	SPS	RBT	2	3	122.67	10.693	96.12	149.21	116	135
81 Jul 27	3	SPS	RBT	2	1	156.00					
81 Jul 27	3	SPS	RBT	3	1	191.00					
81 Jul 29	4	SPS	RBT	0	1	48.00					
81 Jul 29	4	SPS	RBT	1	4	99.50	13.772	77.60	121.40	83	114
81 Jul 29	5	SPS	RBT	0	14	58.50	3.590	56.43	60.57	52	64
81 Jul 29	5	SPS	RBT	1	1	99.00					
81 Jul 28	345	SPS	RBT	0	16	56.50	6.713	52.93	60.07	37	64
81 Jul 28	345	SPS	RBT	1	5	99.40	11.929	84.57	114.23	83	114
81 Jul 28	345	SPS	RBT	2	1	156.00					
81 Jul 28	345	SPS	RBT	3	1	191.00					

APPENDIX XI. FISH LENGTH DATA FOR CARNATION CREEK AND OTHER AREA STREAMS

DATE	LOC	GEAR	SPEC	AGE	N	MEAN	SDEV	C.I.MIN	C.I.MAX	RANGE MIN	RANGE MAX
81 Jul 30	6	SPS	RBT	0	160	51.17	3.871	50.57	51.77	39	59
81 Jul 30	6	SPS	RBT	1	9	92.44	10.643	84.25	100.64	77	110
81 Jul 30	6	SPS	RBT	2	1	135.00					
81 Jul 28	8	SPS	RBT	0	40	56.97	4.215	55.63	58.32	49	64
81 Jul 28	8	SPS	RBT	1	7	101.86	13.222	89.61	114.10	86	116
81 Jul 28	8	SPS	RBT	2	1	135.00					
81 Oct 14	2	SPS	RBT	1	1	109.00					
81 Oct 14	2	SPS	RBT	2	1	142.00					
81 Sep 16	4	SPS	RBT	1	2	104.50	13.435	-16.25	225.25	95	114
81 Sep 16	5	SPS	RBT	0	6	75.17	3.312	71.69	78.64	72	79
81 Sep 15	245	SPS	RBT	0	6	75.17	3.312	71.69	78.64	72	79
81 Sep 15	245	SPS	RBT	1	3	106.00	9.849	81.55	130.45	95	114
81 Sep 15	245	SPS	RBT	2	1	142.00					
81 Sep 17	6	SPS	RBT	0	163	64.06	5.048	63.29	64.84	51	75
81 Sep 17	6	SPS	RBT	1	9	98.89	7.441	93.16	104.62	87	112
81 Sep 17	6	SPS	RBT	3	1	210.00					
81 Sep 17	8	SPS	RBT	0	41	69.88	5.031	68.29	71.47	61	82
81 Sep 17	8	SPS	RBT	1	2	100.00	2.828	74.58	125.42	98	102
81 May 21	TOTL	SPS	CT	1	5	79.60	14.082	62.09	97.11	63	94
81 May 21	TOTL	SPS	CT	2	5	113.60	6.269	105.81	121.39	106	122
81 May 21	TOTL	SPS	CT	3	2	141.00	5.657	90.16	191.84	137	145
81 Jul 28	TOTL	SPS	CT	1	19	97.68	11.809	91.99	103.37	77	121
81 Jul 28	TOTL	SPS	CT	2	5	138.20	25.548	106.44	169.96	107	167
81 Jul 28	TOTL	SPS	CT	3	1	185.00					
81 Sep 15	TOTL	SPS	CT	0	1	63.00					
81 Sep 15	TOTL	SPS	CT	1	16	96.69	13.690	89.40	103.98	77	119
81 Sep 15	TOTL	SPS	CT	2	5	139.60	14.241	121.90	157.30	128	158
81 Sep 15	TOTL	SPS	CT	3	2	230.00	5.657	179.16	280.84	226	234
81 May 22	2	SPS	ALUT	-	62	66.45	12.005	63.42	69.49	41	111
81 May 22	3	SPS	ALUT	-	9	85.78	15.746	73.65	97.90	61	107
81 May 20	4	SPS	ALUT	-	9	88.22	21.879	71.38	105.07	58	129
81 May 20	5	SPS	ALUT	-	7	82.00	17.156	66.11	97.89	68	109
81 May 21	6	SPS	ALUT	-	12	93.92	17.133	83.04	104.80	74	122
81 May 21	8	SPS	ALUT	-	9	80.78	14.584	69.55	92.01	65	108
81 May 21	TOTL	SPS	ALUT	-	108	75.13	17.664	71.76	78.50	41	129
81 Jul 28	2	SPS	ALUT	-	73	67.29	12.234	64.44	70.14	49	109
81 Jul 27	3	SPS	ALUT	-	7	85.43	16.841	69.83	101.02	67	113
81 Jul 29	4	SPS	ALUT	-	10	90.60	12.903	81.38	99.82	68	103
81 Jul 29	5	SPS	ALUT	-	12	85.42	16.251	75.10	95.74	57	106
81 Jul 30	6	SPS	ALUT	-	6	89.17	6.969	81.85	96.48	79	98
81 Jul 28	8	SPS	ALUT	-	14	93.50	13.614	85.64	101.36	67	116
81 Jul 28	TOTL	SPS	ALUT	-	122	76.11	16.817	73.12	79.09	49	116
81 Oct 14	2	SPS	ALUT	-	101	66.77	11.361	64.53	69.01	43	93
81 Sep 15	3	SPS	ALUT	-	9	82.56	19.654	67.42	97.69	56	113
81 Sep 16	4	SPS	ALUT	-	7	88.00	5.715	82.71	93.29	78	94
81 Sep 16	5	SPS	ALUT	-	10	98.50	12.286	89.72	107.28	73	116
81 Sep 17	6	SPS	ALUT	-	7	92.57	7.569	85.56	99.58	85	103
81 Sep 17	8	SPS	ALUT	-	6	86.50	9.566	76.46	96.54	78	102

APPENDIX XI. FISH LENGTH DATA FOR CARNATION CREEK AND OTHER AREA STREAMS

DATE	LOC	GEAR	SPEC	AGE	N	MEAN	SDEV	C.I.MIN	C.I.MAX	RANGE MIN	RANGE MAX
81 May 22	2	SPS	ASPR	-	17	91.41	21.949	80.13	102.70	58	127
81 Jul 28	2	SPS	ASPR	-	30	87.60	17.565	81.06	94.14	57	143
81 Jul 28	TOTL	SPS	ASPR	-	33	89.64	18.086	83.25	96.03	57	143
81 Oct 14	2	SPS	ASPR	-	23	93.74	15.783	86.93	100.55	75	142
81 May 20	1600	S	COHO	0	6	49.00	5.621	43.10	54.90	41	54
81 May 20	1600	S	COHO	1	38	67.84	10.085	64.54	71.15	55	92
81 Jul 29	1600	S	COHO	0	14	64.14	7.357	59.90	68.39	51	72
81 Jul 29	1600	S	COHO	1	2	88.00	4.243	49.87	126.13	85	91
81 Sep 16	1600	S	COHO	0	35	62.83	8.590	59.88	65.78	42	78
81 Sep 16	1600	S	COHO	1	8	82.00	5.318	77.56	86.44	77	90
81 May 13	2100	S	CT	1	8	79.25	8.481	72.17	86.33	63	89
81 May 13	2100	S	CT	2	4	118.75	14.151	96.25	141.25	105	135
81 May 13	2100	S	CT	3	2	151.00	0.000	151.00	151.00	151	151
81 Sep 14	2100	S	CT	0	39	59.51	8.846	56.65	62.37	37	75
81 Sep 14	2100	S	CT	1	9	98.67	12.649	88.93	108.41	80	120
81 Sep 14	2100	S	CT	2	3	137.00	13.454	103.60	170.40	126	152
81 May 14	9	S	CT	1	41	67.85	12.932	63.77	71.93	45	92
81 May 14	9	S	CT	2	17	112.18	10.684	106.68	117.67	96	130
81 May 14	9	S	CT	3	4	144.00	7.439	132.17	155.83	136	154
81 Sep 15	9	S	CT	0	62	48.08	7.264	46.24	49.92	26	71
81 Sep 15	9	S	CT	1	39	94.05	13.930	89.55	98.56	76	124
81 Sep 15	9	S	CT	2	2	143.00	18.385	-22.23	308.23	130	156
81 Aug 26	USEL	S	COHO	0	2	42.00	4.243	3.87	80.13	39	45
81 Aug 26	USEL	S	CT	0	1	56.00					
81 Aug 26	USEL	S	CT	1	9	83.56	5.570	79.27	87.84	73	91
81 Aug 26	USEL	S	CT	2	6	111.83	9.988	101.35	122.31	103	125
81 Aug 26	USEL	S	CT	3	1	167.00					
81 Aug 26	USEL	S	ALUT	-	48	65.56	17.684	60.43	70.69	41	104
81 Aug 27	PACH	SPS	COHO	0	226	62.73	5.989	61.95	63.52	51	78
81 Aug 27	PACH	SPS	COHO	1	9	86.56	7.699	80.63	92.48	81	103
81 Aug 27	PACH	SPS	RBT	0	16	60.88	3.263	59.14	62.61	55	66
81 Aug 27	PACH	SPS	RBT	1	2	74.00	1.414	61.29	86.71	73	75
81 Aug 27	PACH	SPS	RBT	2	1	128.00					
81 Aug 27	PACH	SPS	ALUT	-	39	69.95	11.555	66.21	73.69	50	92
81 Aug 27	PACH	SPS	ASPR	-	43	88.72	16.846	83.56	93.88	65	139
81 Aug 28	RITH	S	CT	0	80	52.01	8.056	50.22	53.80	37	69
81 Aug 28	RITH	S	CT	1	15	113.33	9.611	108.02	118.64	99	131
81 Aug 28	RITH	S	CT	2	6	151.17	9.432	141.27	161.06	139	164
81 Aug 28	RITH	S	CT	3	3	198.00	8.888	175.93	220.07	191	208

APPENDIX XI. FISH LENGTH DATA FOR CARNATION CREEK AND OTHER AREA STREAMS

DATE	LOC	GEAR	SPEC	AGE	N	MEAN	SDEV	C.I.MIN	C.I.MAX	RANGE MIN	RANGE MAX
82 Apr 11	FENC	TR	CHUM	0	63	43.73	0.677	43.56	43.90	42	45
82 Apr 15	FENC	TR	CHUM	0	50	43.16	0.618	42.98	43.34	42	44
82 Apr 20	FENC	TR	CHUM	0	52	43.73	0.770	43.52	43.94	42	45
82 Apr 30	FENC	TR	CHUM	0	26	42.31	0.736	42.01	42.60	41	44
82 Mar 15	FENC	TR	COHO	0	18	37.00	2.058	35.98	38.02	34	40
82 Mar 25	FENC	TR	COHO	0	59	37.68	1.995	37.16	38.20	35	41
82 Apr 11	FENC	TR	COHO	0	72	36.64	0.997	36.41	36.87	35	39
82 Mar 12	FENC	TR	COHO	1	5	74.20	2.490	71.10	77.30	70	76
82 Mar 19	FENC	TR	COHO	1	2	71.50	4.950	27.01	115.99	68	75
82 Mar 24	FENC	TR	COHO	1	6	75.17	7.250	67.56	82.77	64	81
82 Mar 24	FENC	TR	COHO	2	1	83.00					
82 Mar 31	FENC	TR	COHO	1	50	75.52	5.963	73.82	77.22	60	85
82 Mar 31	FENC	TR	COHO	2	12	85.75	5.190	82.45	89.05	79	95
82 Apr 07	FENC	TR	COHO	1	9	72.89	6.791	67.66	78.12	62	81
82 Apr 07	FENC	TR	COHO	2	2	81.50	2.121	62.44	100.57	80	83
82 Apr 14	FENC	TR	COHO	1	141	78.12	5.234	77.26	78.98	63	89
82 Apr 14	FENC	TR	COHO	2	26	92.19	5.993	89.77	94.61	82	105
82 Apr 21	FENC	TR	COHO	1	168	80.61	6.399	79.64	81.57	65	94
82 Apr 21	FENC	TR	COHO	2	51	93.53	7.100	91.53	95.53	81	109
82 Apr 28	FENC	TR	COHO	1	314	85.54	7.403	84.72	86.36	63	107
82 Apr 28	FENC	TR	COHO	2	95	98.13	9.543	96.19	100.06	78	122
82 May 05	FENC	TR	COHO	1	792	87.47	7.015	86.98	87.96	61	103
82 May 05	FENC	TR	COHO	2	213	103.00	6.333	102.15	103.86	93	120
82 May 12	FENC	TR	COHO	1	707	89.10	7.038	88.58	89.62	69	107
82 May 12	FENC	TR	COHO	2	109	102.16	6.652	100.89	103.42	92	122
82 May 19	FENC	TR	COHO	1	411	88.80	6.846	88.13	89.46	72	105
82 May 19	FENC	TR	COHO	2	53	101.40	6.332	99.66	103.14	92	122
82 May 26	FENC	TR	COHO	1	110	87.47	5.298	86.47	88.47	78	100
82 May 26	FENC	TR	COHO	2	14	101.29	7.226	97.11	105.46	92	117
82 Jun 01	FENC	TR	COHO	1	42	87.45	5.627	85.71	89.20	74	97
82 Jun 01	FENC	TR	COHO	2	4	103.75	3.202	98.66	108.84	99	106
82 May 28	2	SPS	COHO	0	195	45.65	6.266	44.77	46.53	34	64
82 May 28	2	SPS	COHO	1	6	88.83	5.345	83.23	94.44	82	94
82 May 25	3	SPS	COHO	0	115	46.97	5.739	45.91	48.03	36	60
82 May 25	3	SPS	COHO	1	7	83.43	8.979	75.11	91.74	68	95
82 May 26	4	SPS	COHO	0	298	43.62	4.329	43.13	44.11	37	60
82 May 26	4	SPS	COHO	1	12	75.83	5.540	72.31	79.35	64	83
82 May 26	5	SPS	COHO	0	69	47.10	2.824	46.42	47.78	41	56
82 May 26	5	SPS	COHO	1	3	77.67	4.933	65.42	89.91	72	81
82 May 27	6	SPS	COHO	0	201	44.33	3.418	43.86	44.80	37	62
82 May 27	8	SPS	COHO	0	128	43.48	5.620	42.50	44.45	36	58
82 May 27	8	SPS	COHO	1	8	79.13	6.175	73.97	84.28	71	87
82 Jul 26	2	SPS	COHO	0	145	60.40	8.280	59.05	61.75	39	81
82 Jul 26	2	SPS	COHO	1	3	89.00	4.583	77.62	100.38	85	94
82 Jul 27	3	SPS	COHO	0	164	63.60	7.955	62.39	64.82	40	83
82 Jul 27	3	SPS	COHO	1	5	95.20	10.569	82.06	108.34	83	103
82 Jul 27	4	SPS	COHO	0	334	57.42	8.688	56.49	58.35	39	82
82 Jul 27	4	SPS	COHO	1	4	86.75	5.560	77.91	95.59	79	92

APPENDIX XI. FISH LENGTH DATA FOR CARNATION CREEK AND OTHER AREA STREAMS

DATE	LOC	GEAR	SPEC	AGE	N	MEAN	SDEV	C.I.MIN	C.I.MAX	RANGE MIN	RANGE MAX
82 Jul 28	5	SPS	COHO	0	107	67.60	5.024	66.64	68.56	51	80
82 Jul 28	5	SPS	COHO	1	7	86.57	2.699	84.07	89.07	81	89
82 Jul 28	6	SPS	COHO	0	181	60.44	5.398	59.65	61.22	49	79
82 Jul 28	8	SPS	COHO	0	201	59.66	7.020	58.69	60.63	41	79
82 Jul 28	8	SPS	COHO	1	8	85.50	3.546	82.54	88.46	81	92
82 Jul 31	400	SPS	COHO	0	183	59.77	8.537	58.53	61.00	44	83
82 Jul 30	950	SPS	COHO	0	269	56.43	8.184	55.45	57.41	43	79
82 Jul 30	950	SPS	COHO	1	5	84.40	4.159	79.23	89.57	80	89
82 Jul 30	1400	SPS	COHO	0	133	63.92	6.825	62.76	65.08	49	80
82 Jul 30	1400	SPS	COHO	1	4	88.50	8.347	75.23	101.77	79	99
82 Jul 30	1700	SPS	COHO	0	152	66.93	4.568	66.20	67.65	51	80
82 Jul 30	1700	SPS	COHO	1	3	84.67	4.726	72.93	96.40	81	90
82 Jul 29	2000	SPS	COHO	0	204	59.26	5.510	58.51	60.02	41	77
82 Jul 29	2700	SPS	COHO	0	84	64.80	6.297	63.43	66.16	47	80
82 Jul 29	2700	SPS	COHO	1	3	95.67	5.860	81.12	110.21	89	100
82 Sep 22	2	SPS	COHO	0	125	65.84	8.356	64.38	67.30	47	86
82 Sep 22	2	SPS	COHO	1	3	90.33	4.041	80.30	100.37	88	95
82 Sep 20	3	SPS	COHO	0	135	68.10	9.006	66.58	69.62	42	87
82 Sep 20	3	SPS	COHO	1	6	96.00	8.222	87.37	104.63	88	108
82 Sep 22	4	SPS	COHO	0	257	60.99	9.849	59.78	62.19	40	84
82 Sep 22	4	SPS	COHO	1	2	91.00	2.828	65.58	116.42	89	93
82 Sep 23	5	SPS	COHO	0	100	73.34	5.862	72.18	74.50	60	86
82 Sep 23	5	SPS	COHO	1	4	90.75	3.202	85.66	95.84	88	94
82 Sep 23	6	SPS	COHO	0	147	65.14	5.913	64.18	66.09	52	83
82 Sep 23	8	SPS	COHO	0	158	66.11	6.836	65.04	67.17	54	82
82 Sep 23	8	SPS	COHO	1	11	89.45	6.006	85.42	93.49	84	105
82 Nov 23	3	SPS	COHO	0	30	68.33	10.835	64.30	72.37	50	89
82 Nov 23	3	SPS	COHO	1	1	102.00					
82 Nov 25	4	SPS	COHO	0	40	64.57	8.117	61.98	67.17	49	83
82 Nov 25	4	SPS	COHO	1	2	94.00	2.828	68.58	119.42	92	96
82 Nov 25	5	SPS	COHO	0	19	70.68	7.402	67.12	74.25	60	86
82 Nov 24	6	SPS	COHO	0	16	70.75	8.653	66.14	75.36	53	87
82 Nov 24	8	SPS	COHO	0	9	69.89	8.373	63.44	76.34	58	82
82 May 26	TOTL	SPS	RBT	1	41	87.41	7.355	85.09	89.73	71	103
82 May 26	TOTL	SPS	RBT	2	8	129.63	20.646	112.40	146.85	101	165
82 Jul 28	8	SPS	RBT	0	133	48.29	3.805	47.64	48.93	40	56
82 Jul 28	8	SPS	RBT	1	16	105.44	9.571	100.34	110.53	80	120
82 Jul 28	8	SPS	RBT	2	2	132.00	5.657	81.16	182.84	128	136
82 Jul 27	TOTL	SPS	RBT	0	139	48.10	3.905	47.45	48.75	40	56
82 Jul 27	TOTL	SPS	RBT	1	38	104.37	9.173	101.36	107.38	86	122
82 Jul 27	TOTL	SPS	RBT	2	5	139.00	22.383	111.17	166.83	122	178
82 Jul 29	2700	SPS	RBT	1	18	106.44	9.370	101.78	111.10	85	125
82 Jul 29	2700	SPS	RBT	2	5	131.80	8.556	121.16	142.44	118	140
82 Jul 30	XTRA	SPS	RBT	1	46	105.83	8.473	103.32	108.34	85	126
82 Jul 30	XTRA	SPS	RBT	2	10	130.50	7.692	125.00	136.00	118	142
82 Sep 23	8	SPS	RBT	0	120	64.02	4.950	63.12	64.91	54	75
82 Sep 23	8	SPS	RBT	1	22	109.45	9.455	105.26	113.65	91	128
82 Sep 23	8	SPS	RBT	2	1	141.00					

APPENDIX XI. FISH LENGTH DATA FOR CARNATION CREEK AND OTHER AREA STREAMS

DATE	LOC	GEAR	SPEC	AGE	N	MEAN	SDEV	C.I.MIN	C.I.MAX	RANGE MIN	RANGE MAX
82 Sep 22	TOTL	SPS	RBT	0	129	64.47	5.216	63.57	65.37	54	80
82 Sep 22	TOTL	SPS	RBT	1	39	110.64	8.901	107.76	113.52	91	131
82 Sep 22	TOTL	SPS	RBT	2	6	148.50	26.674	120.51	176.49	123	182
82 Nov 24	TOTL	SPS	RBT	0	13	72.08	8.741	66.79	77.36	58	88
82 Nov 24	TOTL	SPS	RBT	1	14	112.64	7.530	108.30	116.99	101	123
82 Jul 29	2700	SPS	RBCT	0	223	42.96	4.919	42.32	43.61	30	57
82 Jul 30	XTRA	SPS	RBCT	0	264	42.76	4.645	42.20	43.32	30	57
82 May 26	TOTL	SPS	CT	1	5	91.60	7.092	82.78	100.42	84	102
82 May 26	TOTL	SPS	CT	2	6	118.33	14.976	102.62	134.05	96	132
82 May 26	TOTL	SPS	CT	3	3	182.33	26.652	116.17	248.50	152	202
82 May 26	TOTL	SPS	CT	4	2	254.00	19.799	76.06	431.94	240	268
82 Jul 27	TOTL	SPS	CT	0	5	36.60	2.074	34.02	39.18	34	39
82 Jul 27	TOTL	SPS	CT	1	11	107.82	10.741	100.60	115.04	93	124
82 Jul 27	TOTL	SPS	CT	2	3	171.67	32.624	90.67	252.66	136	200
82 Jul 27	TOTL	SPS	CT	3	3	217.00	5.568	203.18	230.82	211	222
82 Jul 30	XTRA	SPS	CT	1	6	104.83	11.531	92.73	116.93	89	119
82 Jul 30	XTRA	SPS	CT	2	8	155.38	25.042	134.48	176.27	123	196
82 Jul 30	XTRA	SPS	CT	3	2	229.00	18.385	63.77	394.23	216	242
82 Sep 22	TOTL	SPS	CT	0	6	44.33	5.086	39.00	49.67	37	50
82 Sep 22	TOTL	SPS	CT	1	8	106.88	11.898	96.95	116.80	92	126
82 Sep 22	TOTL	SPS	CT	2	9	165.00	28.027	143.42	186.58	135	210
82 Sep 22	TOTL	SPS	CT	3	2	217.50	2.121	198.43	236.57	216	219
82 Nov 24	TOTL	SPS	CUTT	0	10	62.20	7.436	56.89	67.51	51	76
82 Nov 24	TOTL	SPS	CUTT	1	5	109.60	8.503	99.03	120.17	96	118
82 Nov 24	TOTL	SPS	CUTT	2	2	158.50	0.707	152.15	164.85	158	159
82 May 28	2	SPS	ALUT	-	107	64.51	12.329	62.15	66.87	43	91
82 May 25	3	SPS	ALUT	-	10	102.20	32.065	79.28	125.12	49	162
82 May 26	4	SPS	ALUT	-	11	100.45	15.155	90.26	110.64	64	124
82 May 26	5	SPS	ALUT	-	19	96.32	12.320	90.38	102.25	67	114
82 May 27	6	SPS	ALUT	-	10	89.00	7.572	83.59	94.41	77	102
82 May 27	8	SPS	ALUT	-	12	96.83	10.727	90.02	103.65	77	116
82 Jul 26	2	SPS	ALUT	-	191	58.50	12.797	56.68	60.31	39	93
82 Jul 27	3	SPS	ALUT	-	20	70.60	20.610	60.97	80.23	48	112
82 Jul 27	4	SPS	ALUT	-	15	83.07	18.557	72.81	93.32	63	106
82 Jul 28	5	SPS	ALUT	-	9	99.33	10.223	91.46	107.20	81	113
82 Jul 28	6	SPS	ALUT	-	7	85.71	17.114	69.87	101.56	59	107
82 Jul 28	8	SPS	ALUT	-	25	100.20	12.662	94.98	105.42	72	117
82 Jul 31	400	SPS	ALUT	-	211	55.80	10.557	54.38	57.23	42	105
82 Jul 30	950	SPS	ALUT	-	33	79.09	18.355	72.60	85.58	50	111
82 Jul 30	1400	SPS	ALUT	-	21	86.81	15.009	79.96	93.65	60	125
82 Jul 30	1700	SPS	ALUT	-	21	91.71	11.663	86.40	97.03	73	112
82 Jul 29	2000	SPS	ALUT	-	17	85.35	10.380	80.02	90.69	66	107
82 Jul 29	2700	SPS	ALUT	-	5	97.00	11.619	82.55	111.45	82	114
82 Sep 22	2	SPS	ALUT	-	136	61.95	11.926	59.94	63.95	41	98
82 Sep 20	3	SPS	ALUT	-	15	79.53	16.004	70.69	88.38	59	111
82 Sep 22	4	SPS	ALUT	-	6	91.67	8.406	82.85	100.49	82	104
82 Sep 23	5	SPS	ALUT	-	20	87.95	14.648	81.10	94.80	66	112
82 Sep 23	6	SPS	ALUT	-	12	89.50	9.424	83.51	95.49	71	103

APPENDIX XI. FISH LENGTH DATA FOR CARNATION CREEK AND OTHER AREA STREAMS

DATE	LOC	GEAR	SPEC	AGE	N	MEAN	SDEV	C.I.MIN	C.I.MAX	RANGE MIN	RANGE MAX
82 Sep 23	8	SPS	ALUT	-	18	97.39	11.678	91.58	103.20	78	114
82 Nov 24	TOTL	SPS	ALUT	-	27	92.00	15.290	85.94	98.06	61	117
82 May 28	2	SPS	ASPR	-	36	81.58	20.549	74.63	88.54	58	162
82 Jul 26	2	SPS	ASPR	-	24	91.96	17.459	84.58	99.34	59	130
82 Jul 31	400	SPS	ASPR	-	29	86.31	14.729	80.70	91.92	63	128
82 Sep 22	2	SPS	ASPR	-	20	94.10	13.010	88.02	100.18	81	138
82 May 26	1600	S	COHO	0	9	49.44	3.779	46.53	52.35	44	55
82 May 26	1600	S	COHO	1	18	84.11	10.654	78.81	89.41	68	110
82 Sep 22	1600	S	COHO	0	24	63.63	6.807	60.75	66.50	52	74
82 Sep 22	1600	S	COHO	1	4	86.50	10.149	70.36	102.64	77	98
82 May 28	2100	S	CT	1	9	73.11	10.228	65.24	80.99	61	91
82 May 28	2100	S	CT	2	8	110.00	12.728	99.38	120.62	87	127
82 May 28	2100	S	CT	3	1	164.00					
82 Sep 21	2100	S	CT	0	34	51.59	7.451	48.99	54.18	33	63
82 Sep 21	2100	S	CT	1	15	96.53	9.086	91.51	101.55	81	111
82 Sep 21	2100	S	CT	2	1	123.00					
82 Sep 21	2100	S	CT	3	1	200.00					
82 May 29	UPER	S	CT	1	24	62.83	8.565	59.21	66.45	43	80
82 May 29	UPER	S	CT	2	34	109.94	16.877	104.07	115.82	85	143
82 May 29	UPER	S	CT	3	1	187.00					
82 Sep 21	UPER	S	CT	0	88	42.88	6.129	41.57	44.18	32	55
82 Sep 21	UPER	S	CT	1	44	93.73	15.850	88.92	98.53	68	120
82 Sep 21	UPER	S	CT	2	1	144.00					
82 Aug 26	PACH	SPS	COHO	0	345	53.11	8.073	52.26	53.96	42	85
82 Aug 26	PACH	SPS	COHO	1	9	100.33	7.246	94.75	105.91	89	111
82 Aug 26	PACH	SPS	RBT	0	68	49.72	3.291	48.93	50.51	41	57
82 Aug 26	PACH	SPS	RBT	2	3	157.33	20.257	107.04	207.62	141	180
82 Aug 26	PACH	SPS	ALUT	-	29	70.41	9.534	66.78	74.04	53	88
82 Aug 26	PACH	SPS	ASPR	-	49	91.76	16.675	86.97	96.54	64	140
82 Aug 25	USEL	S	COHO	0	7	64.86	3.388	61.72	67.99	60	70
82 Aug 25	USEL	S	CT	0	28	47.54	7.208	44.74	50.33	30	58
82 Aug 25	USEL	S	CT	1	5	92.40	12.012	77.47	107.33	76	108
82 Aug 25	USEL	S	CT	2	3	156.33	20.008	106.66	206.01	136	176
82 Aug 25	USEL	S	CT	3	1	194.00					
82 Aug 25	USEL	S	ALUT	-	65	69.58	18.854	64.93	74.24	40	113
82 Aug 24	RITH	S	CT	0	99	48.48	8.257	46.84	50.13	33	82
82 Aug 24	RITH	S	CT	1	12	98.83	11.142	91.76	105.91	85	128
82 Aug 24	RITH	S	CT	2	9	158.00	22.500	140.68	175.32	123	197

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APPENDIX XII. FISH LENGTH-WEIGTH DATA AND CONDITION FACTOR (K)

Date	Location	Section	Species	n	age	K	a (x10-5)	b
1981								
Mar. 12	Carnation	Fence	Chum	70	0	0.658	48.497	1.841
Mar. 19	Carnation	Fence	Chum	50	0	0.637	88.423	1.677
Mar. 26	Carnation	Fence	Chum	50	0	0.590	1.391	2.770
Apr. 2	Carnation	Fence	Chum	49	0	0.601	219.940	1.424
Apr. 10	Carnation	Fence	Chum	38	0	0.601	6.153	2.380
Mar. 26	Carnation	Fence	Coho	17	1	1.040	0.415	3.213
				5	2	1.136	8.841	2.558
Apr. 9	Carnation	Fence	Coho	15	1	1.049	0.226	3.357
				5	2	1.116	1.522	2.932
Apr. 16	Carnation	Fence	Coho	12	1	0.936	56.946	2.090
				6	2	0.896	3098.200	1.260
Apr. 24	Carnation	Fence	Coho	16	1	0.980	2.263	2.808
				4	2	0.997	1.314	2.942
Apr. 30	Carnation	Fence	Coho	14	1	0.965	3.616	2.702
				6	2	1.003	38.150	2.213
May 14	Carnation	Fence	Coho	16	1	0.958	2.138	2.819
				4	2	0.945	64.928	2.085
May 28	Carnation	Fence	Coho	19	1	0.991	0.699	3.079
May 22	Carnation	II	Coho	18	0	1.089	0.970	3.030
				6	1	1.078	11.283	2.467
May 21	Carnation	VI	Coho	24	0	1.006	0.457	3.207
				9	1	1.181	0.247	3.372
July 28	Carnation	II	Coho	21	0	1.143	1.640	2.914
				5	1	1.199	44.087	2.185
July 30	Carnation	VI	Coho	22	0	1.073	0.510	3.183
				5	1	1.159	506.630	1.596
Sep. 17	Carnation	VI	Coho	17	0	1.094	1.478	2.928
				6	1	1.083	0.059	3.667
Oct. 14	Carnation	II	Coho	17	0	1.095	2.248	2.835
				5	1	1.145	0.191	3.392
May 21	Carnation	VI&VIII	Rainbow	13	1	1.182	0.501	3.199
July 30	Carnation	VI&VIII	Rainbow	22	0	0.992	2.337	2.785
				6	1	1.035	1.235	2.965
Sep. 17	Carnation	VI&VIII	Rainbow	25	0	1.003	1.428	2.916
				6	1	1.043	0.001	4.574
Sep. 17	Carnation	ALL	Rainbow	5	2&3	1.017	0.404	3.184

APPENDIX XII. FISH LENGTH-WEIGTH DATA AND CONDITION FACTOR (K)

Date	Location	Section	Species	n	age	K	a (x10-5)	b
1981								
May 21	Carnation	VI&VIII	Cutthroat	6	1&2	1.016	7.877	2.552
July 30	Carnation	VI&VIII	Cutthroat	7	1	1.019	0.887	3.030
July 28	Carnation	VIII	Cutthroat	4	2&3	0.963	10.345	2.528
Sep. 17	Carnation	VI&VIII	Cutthroat	8	1	1.024	3.362	2.742
May 22	Carnation	II	Aleuticus	16	ALL	1.080	0.884	3.051
May 21	Carnation	VI	Aleuticus	9	ALL	1.085	0.113	3.501
July 28	Carnation	II	Aleuticus	17	ALL	1.053	3.442	2.728
July 28	Carnation	VIII	Aleuticus	6	ALL	1.156	1.042	3.022
Set. 17	Carnation	VI&VIII	Aleuticus	8	ALL	1.193	0.149	3.464
Oct. 14	Carnation	II	Aleuticus	21	ALL	1.049	0.410	3.221
May 22	Carnation	II	Asper	10	ALL	1.083	0.416	3.207
July 28	Carnation	II	Asper	14	ALL	1.106	0.035	3.741
Oct. 14	Carnation	II	Asper	15	ALL	1.108	10.508	2.510
May 14	Carnation	9	Cutthroat	10	1	0.952	0.378	3.216
				8	2&3	0.953	2.106	2.833
Sep. 15	Carnation	9	Cutthroat	14	0	0.911	0.708	3.070
				14	1	0.978	0.776	3.050
				2	2	0.934	3.281	2.747
May 13	Carnation	Trib C	Cutthroat	7	1	1.033	3.861	2.701
				6	2&3	0.978	0.291	3.249
Sep. 14	Carnation	Trib C	Cutthroat	19	0	1.035	1.845	2.862
				8	1	0.960	1.043	2.983
				3	2	0.979	146.760	1.980
Aug. 26	Useless	-	Coho	2	0	0.816	0.524	3.119
Aug. 26	Useless	-	Cutthroat	6	1	1.007	1.177	2.965
				5	2	0.929	0.247	3.281
Aug. 26	Useless	-	Aleuticus	16	ALL	1.033	0.092	3.539
Aug. 28	Ritherdon	-	Cutthroat	18	0	0.965	0.463	3.185
				10	1	1.018	0.110	3.471
				9	2&3	0.998	1.087	2.986
Aug. 27	Pachena	-	Coho	15	0	1.074	1.133	2.987
				6	1	1.117	0.407	3.226
Aug. 27	Pachena	-	Rainbow	7	0	0.997	2.802	2.747
				2	1&2	1.029	1.912	2.865
Aug. 27	Pachena	-	Aleuticus	10	ALL	1.019	0.505	3.164
Aug. 27	Pachena	-	Asper	9	ALL	1.051	0.075	3.576

APPENDIX XII. FISH LENGTH-WEIGTH DATA AND CONDITION FACTOR (K)

Date	Location	Section	Species	n	age	K	a (x10-5)	b
1982								
Mar. 29	Carnation	Fence	Chum	10	0	0.586	10458.000	0.399
Apr. 11	Carnation	Fence	Chum	11	0	0.631	12428.000	0.385
Apr. 15	Carnation	Fence	Chum	50	0	0.735	293880.000	-0.426
Apr. 30	Carnation	Fence	Chum	13	0	0.746	203030.000	-0.336
Mar. 15	Carnation	Fence	Coho	18	0	0.733	0.536	3.087
Mar. 29	Carnation	Fence	Coho	10	0	0.734	0.029	3.885
Apr. 11	Carnation	Fence	Coho	12	0	0.747	29.176	1.982
Mar. 30	Carnation	Fence	Coho	13	1	0.996	1.579	2.893
				7	2	1.018	1.473	2.916
Apr. 11	Carnation	Fence	Coho	21	1	1.010	4.274	2.668
				4	2	1.024	2.0183E+08	-1.269
Apr. 22	Carnation	Fence	Coho	13	1	1.026	0.689	3.092
				7	2	1.007	1.035	2.994
May 6	Carnation	Fence	Coho	13	1	0.942	3.943	2.678
				7	2	0.931	0.416	3.174
May 20	Carnation	Fence	Coho	15	1	0.953	6.239	2.580
				3	2	0.967	3.038	2.751
May 28	Carnation	II	Coho	15	0	1.028	0.368	3.270
				2	1	1.073	3527.700	1.191
May 27	Carnation	VI	Coho	11	0	1.012	0.310	3.308
May 27	Carnation	VIII	Coho	4	1	1.088	0.582	3.142
July 26	Carnation	II	Coho	19	0	1.000	0.414	3.216
July 28	Carnation	VI	Coho	14	0	1.094	0.798	3.075
Sep. 22	Carnation	II	Coho	18	0	1.067	0.542	3.161
Sep. 23	Carnation	VI	Coho	15	0	1.060	0.353	3.262
May 28	Carnation	II	Rainbow	4	2	0.957	17.404	2.409
May 27	Carnation	VI	Rainbow	6	1	1.221	12.595	2.468
May 27	Carnation	VIII	Rainbow	3	1	1.017	0.216	3.337
May 27	Carnation	VIII	Cutthroat	3	1	0.986	0.096	3.512
				3	2	0.901	3.184	2.736
July 26	Carnation	VI	Rainbow	3	0	0.964	0.016	4.076
				6	1	1.027	38.559	2.208
Sep. 22	Carnation	II	Rainbow	2	1	0.941	0.000	6.354
				3	2	0.903	2.946	2.763
Sep. 23	Carnation	VI	Rainbow	4	0	0.987	1.023	2.993
				6	1	1.008	0.218	3.326
May 28	Carnation	II	Aleuticus	11	ALL	1.028	1.552	2.903
May 27	Carnation	VI	Aleuticus	4	ALL	1.166	0.002	4.391
May 27	Carnation	VIII	Aleuticus	4	ALL	1.129	4.768	2.689
July 26	Carnation	II	Aleuticus	11	ALL	0.894	0.920	3.008
July 28	Carnation	VI	Aleuticus	4	ALL	1.036	0.873	3.038
Sep. 22	Carnation	II	Aleuticus	17	ALL	0.964	1.337	2.928
Sep. 23	Carnation	VI	Aleuticus	7	ALL	1.137	2.998	2.786

APPENDIX XII. FISH LENGTH-WEIGTH DATA AND CONDITION FACTOR (K)

Date	Location	Section	Species	n	age	K	a (x10-5)	b
1982								
May 28	Carnation	II	Asper	12	ALL	1.058	0.566	3.145
July 26	Carnation	II	Asper	11	ALL	1.025	0.352	3.237
Sep. 22	Carnation	II	Asper	8	ALL	1.061	0.135	3.448
May 29	Carnation	IX	Cutthroat	10	1	0.945	2.363	2.784
				14	2	1.002	0.920	3.020
May 28	Carnation	Trib C	Cutthroat	7	1	1.083	8.206	2.527
				7	2	0.953	1.007	2.989
Sep. 21	Carnation	IX	Cutthroat	8	0	0.861	0.152	3.457
				14	1	0.981	1.077	2.982
Sep. 21	Carnation	Trib C	Cutthroat	13	0	0.905	0.726	3.059
				9	1	0.974	0.133	3.436
Aug. 26	Pachena	-	Coho	16	0	1.019	0.650	3.112
				4	1	1.033	0.216	3.342
Aug. 26	Pachena	-	Rainbow	6	0	0.909	1.094	2.953
				3	2	0.952	26.102	2.345
Aug. 26	Pachena	-	Aleuticus	6	ALL	0.926	2.425	2.772
Aug. 26	Pachena	-	Asper	11	ALL	1.132	0.013	3.978
Aug. 25	Useless	-	Coho	3	0	1.181	0.192	3.437
Aug. 25	Useless	-	Cutthroat	8	0	0.947	0.422	3.220
				4	1	0.975	4.680	2.651
				3	2	1.013	1.406	2.937
Aug. 25	Useless	-	Aleuticus	17	ALL	1.028	0.326	3.269
Aug. 24	Ritherdon	-	Cutthroat	11	0	0.937	0.662	3.085
				8	1	0.943	14.764	2.403
				8	2	0.968	15.885	2.447
July 26	Carnation	II	Coho	19	1	1.000	0.414	3.216
July 28	Carnation	VI	Coho	13	1	1.094	0.781	3.081
Sep. 22	Carnation	II	Coho	19	1	1.067	0.845	3.057
Sep. 23	Carnation	VI	Coho	14	1	1.076	0.488	3.188
May 28	Carnation	TOTL	Rainbow	5	2	1.009	33.692	2.279
May 27	Carnation	TOTL	Rainbow	10	1	1.140	35.000	2.232
May 27	Carnation	TOTL	Cutthroat	3	1	0.986	0.096	3.512
				6	2	0.880	7.465	2.586
July 26	Carnation	TOTL	Rainbow	3	0	0.964	0.016	4.076
				7	1	1.033	7.683	2.563
Sep. 22	Carnation	TOTL	Rainbow	3	2	0.903	2.946	2.763
Sep. 23	Carnation	TOTL	Rainbow	4	0	0.987	1.023	2.993
				8	1	0.991	0.066	3.578
July 26	Carnation	TOTL	Cutthroat	7	1	0.903	0.711	3.043
Nov. 24	Carnation	VIII	Coho	4	0	1.056	0.856	3.049
Nov. 24	Carnation	VIII	Cutthroat	8	0	0.936	0.745	3.065
Nov. 24	Carnation	VIII	Rainbow	4	0	1.027	58.435	2.059
				5	1	0.943	1.752	2.869
Nov. 24	Carnation	VIII	Aleuticus	4	ALL	1.049	5.156	2.636